

Figure 1A. Amino acid sequence of secreted ColoUp1 protein
(I) (SEQ ID NO: 1)

TVAAGCPDQSPQLPWNPGHDQDHHVHIGQGKTLTSSATVYSIHISEGGKLVKDHD
EPIVLRTRHILIDNGGELHAGSALCPFQGNFTIILYGRADEGIQPDPIYGLKYIGVGKG
GALELHGQKKLSWTFNLKTLHPGGMAEGGYFFERSWGHARGVIVHVIDPKSGTVIHSDFR
DTYRSKKESERLVQYLNAPVDGRILSVAVNDEGSRNLDDMARKAMTKLGSKHFLHLGFR
HPWSFLTVMGNPSSSVEDHIEYHGHRGSAAARVFKLFQTEHGEYFNVSLSSSEWVQDVEW
TEWFDHDKVSQTKGGEKISDLWKAHPGKICNRPIDIQATTMDGVNLSTEVVYKKGQDYR
FACYDRGRACRSYRVRFLCGKPVRPKLTVTIDTNVNSTILNLEDNVQSWKPGDTLVIAS
TDYSMYQAEFFQVLPCRSCAPNQVKVAGKPMYLIHIGEEIDGVDMAEVGLLSRNIIVMG
EMEDKCPYRNHICNFFDFDTFGGHIKFAFGKAAHLEGTELKHMGOQLVGQYPIHFHL
AGDVDERGGYDPPTYIRDLSIHHTFSRCVTVHGSNGLLIKDVVGYNLSLGHCFETEDGPE
ERNTFDHCLGLLVKSGTLLPSDRDSKMCKMITEDSYPGYIPKPRQDCNAVSTFWMANPN
NNLINCAAAGSEETGFWFI FHHVPTGPSVGMYSYSEHIPLGKFYNNRAHSNYRAGMI
IDNGVKTTEASAKDKRPFLSIISARYSPHQDADPLKPREPAIRHFIAYKNQDHGAWLR
GGDVWLDSCRADNGIGLTLASGGTFPYDDGSKQEIKNLSLFVGESGNVGTMMNDNRWIG
PGGLDHSGRTLPIGQNFPIRGIQLYDGPINIQNCTFRKFVALEGRHTSALAFLNNAWQ
SCPHNNVTGIAFEDVPITSRVFFGEPGPWFNQDMDGDKTSVFHDVDGSVSEYPGSYLT
KNDNWLVRHPDCINVPDWRGAICSGCYAQMYIQAYKTSNLRMKIINKDFPSHPLYLEGA
LTRSTHYQQYQPVVTLQKGYTIHWDQTAPAEALAIWLINFNKGDWIRVGLCYPRGTTFSI
LSDVHNRLKQTSKTGVFVRTLQMDKVEQSYPGRSHYYWDEDSGLLFLKLKAQNEREF
AFCSMKGCERIKIKALIPKNAGVSDCTATAYPKFTERAVVDVPMPPKLFGLKTKDHF
LEVKMESSKQHFFHLWNDFAFIEVDGKKYPSSSEDGIQVVVIDGNQGRVVSHTSFRNSIL
QGIPWQLFNYVATIPDNSIVLMASKGRYVSRGPWTRVLEKLGADRGLKLKEQMAFVGFK
GSFRPIWVTLDTEHAKAIFQVVPPIPVVKKKKL

Figure 1B. Amino acid sequence of secreted ColoUp1 protein
(II) (SEQ ID NO: 2)

AGCPDQSPQLPWNPGHDQDHHVHIGQGKTLTSSATVYSIHISEGGKLVKDHDEPI
VLRTRHILIDNGGELHAGSALCPFQGNFTIILYGRADEGIQPDPIYGLKYIGVGKGGAL
ELHGQKKLSWTFNLKTLHPGGMAEGGYFFERSWGHARGVIVHVIDPKSGTVIHSRDFDTY
RSKKESERLVQYLNAVDPGRILSVAVNDEGSRNLDDMARKAMTKLGSKHFLHLGFRHPW
SFLTVKGNPSSSVEDHIEYHGHRGSAAARVFKLFQTEHGEYFNVSLSSEWVQDVEWTEW
FDHDKVSQTKGGEKISDLWKAHPGKICNRPIDIQATTMDGVNLSTEVVYKKGQDYRFAC
YDRGRACRSYRVRFLCGKPVPRPKLTVTIDTNVNSTILNLEDNVQSWKPGDTLVIASDY
SMYQAEFQVLPCRSCAPNQVKVAGKPMYLIHIGEEIDGVDMAEVGLLSRNIIVMGEME
DKCYPYRNHICNFFDFDTFGGHIKFAFGKAAHLEGTELKHMGOQLVGQYPIHFHLAGD
VDERGGYDPPTYIRDLSIHHTFSRCVTVHGSNGLLIKDVVGYNLGHCFFTEDGPEERN
TFDHCLGLLVKSGTLLPSDRDSKMCKMITEDSYPGYIPKPRQDCNAVSTFWMANPNNNL
INCAAAGSEETGFWFIFHHVPTGPSVGMYSYSEHIPLGKFYNNRAHSNYRAGMIIDN
GVKTTEASAKDKRPFLSIISARYSPHQDADPLKPREPAIRHFIAYKNQDHGAWLRGGD
VWLDSCRFADNGIGLTLASGGTFPPYDDGSKQEIKNLSEFVGESGNVGTMMNDNRIWGP
LDHSGRTLPIGQNFPIRGIQLYDGPINIQNCTFRKFVALEGRHTSALAFLNNAWQSCP
HNNVTGIAFEDVPITSRVFFGEPGPWFNQDMDGDKTSVFHDVDGVSSEYPGSYLTKN
NWLVRHPDCINVPDWRGAICSGCYAQMYIQAYKTSNLRMKIKNDFPSHPLYLEGALTR
STHYQQYQPVVTLQKGYTIHWDQTAPAEALIWLINFNKGDWIRVGLCYPRGTTFSILSD
VHNRLKQTSKTVGFVRTLQMDKVEQSYPGRSHYYWDEDSGLLFLKLKAQNEREKFAFC
SMKGCERIKIKALIPKNAGVSDCTATAYPKFTERAVVDVPMKKLFGSQLKTKDHFLEV
KMESSKQHFHFLWNDFAYIEVDGKKYPSSSEDGIQVVVIDGNQGRVVSHTSFRNSILOGI
PWQLFNYVATIPDNSIVLMASKGRYVSRGPWTRVLEKLGADRGLKLKEQMAFVGFKGSF
RPIWVTLDTEDEHKAKIFQVVPIPVVKKKKL

**Figure 2. Amino acid sequence of secreted ColoUp2 protein
(SEQ ID NO: 3)**

LQEVHVSKETIGKISAASKMMWCSAAVDIMFLLDGSNSVGKGSFERSKHFAITVCDGLD
ISPVRVRVGAFQFSSTPHLEFPLDSFSTQQEVKARIKRMVFKGGRTETELALKYLLHRG
LPGGRNASVPQILIIIVTDGKSQGDVALPSKQLKERGVTVFAVGVRFPWRWELHALASEP
RGQHVLLAEQVEDATNGLFSTLSSSAICSSATPDCRVEAHPCEHRTLEMVREFAGNAPC
WRGSRRTLAVLAAHCPFYSWKRVFLTHPATCYRTTCPGPCDSQPCQNGGTCVPEGLDGY
QCLCPLAFGGEANCALKLSLECRVDLLFLLDSSAGTTLDGFLRAKVFKRFVRAVLSED
SRARVGVATYSRELLVAVPVGEYQDVPDLVWSLDGIPFRGGPTLTGSALRQAAERGFSG
ATRTGQDRPRRVVLLTESHSEDEVAGPARHARARELLLLGVGSEAVRAELEETGSPK
HVMVYSDPQDLFNQIPELQGLCSRQRPQCRTQALDLVFMLDTSASVGPENFAQMOSFV
RSCALQFEVNPDVTQVGLVVYGSQVQTAFGLDTKPTRAAMLRAISQAPYLGGVGSAGTA
LLHIYDKVMTVQRGARPGVPAVVVLTGGRGAEDAAVPAQKLRNNGISVLVVGVPVLS
EGLRRLAGPRDSLIIHVAAYADLRYHQDVLI EWLCGEAKQPVNLCKPSPCMNEGSCVLQN
GSYRCKCRDGWEGPHCENRFLRRP

Figure 3. Nucleic acid sequence of ColoUp1 (SEQ ID NO: 4)

CGTGACACTGTCTCGGCTACAGACCCAGAGGGAGCACACTGCCAGGATGGGAGCTGCTG
GGAGGCAGGACTTCCTCTTCAAGGCCATGCTGACCATCAGCTGGCTCACTCTGACCTGC
TTCCTTGGGGCCACATCCACAGTGGCTGCTGGGTGCCCTGACCAGAGCCCTGAGTTGCA
ACCCTGGAACCTTGGCCATGACCAAGACCACCATGTGCATATCGGCCAGGGCAAGACAC
TGCTGCTCACCTCTTCTGCCACGGTCTATTCCATCCACATCTCAGAGGGAGGCAAGCTG
GTCATTAAAGACCACGACGAGCCGATTGTTTTGCGAACCCGGCACATCCTGATTGACAA
CGGAGGAGAGCTGCATGCTGGGAGTGCCCTCTGCCCTTTCCAGGGCAATTTACCATCA
TTTTGTATGGAAGGGCTGATGAAGGTATTAGCCGGATCCTTACTATGGTCTGAAGTAC
ATTGGGGTTGGTAAAGGAGGCGCTCTTGAGTTGCATGGACAGAAAAAGCTCTCCTGGAC
ATTTCTGAACAAGACCCTTACCCAGGTGGCATGGCAGAAGGAGGCTATTTTTTTTGA
GGAGCTGGGGCCACCGTGGAGTTATTGTTTCATGTCATCGACCCCAAATCAGGCACAGTC
ATCCATTCTGACCGGTTTGACACCTATAGATCCAAGAAAGAGAGTGAACGTCTGGTCCA
GTATTTGAACGCGGTGCCCGATGGCAGGATCCTTTCTGTTGCAGTGAATGATGAAGGTT
CTCGAAATCTGGATGACATGGCCAGGAAGGCGATGACCAAATTGGGAAGCAAACACTTC
CTGCACCTTGGATTTAGACACCTTGGAGTTTTCTAACTGTGAAAGGAAATCCATCATC
TTCAGTGGAAGACCATATTGAATATCATGGACATCGAGGCTCTGCTGCTGCCCGGGTAT
TCAAATTGTTCCAGACAGAGCATGGCGAATATTTCAATGTTTTCTTTGTCCAGTGAGTGG
GTTCAAGACGTGGAGTGGACGGAGTGGTTCGATCATGATAAAGTATCTCAGACTAAAGG
TGGGGAGAAAATTTAGACCTCTGGAAAGCTCACCCAGGAAAAATATGCAATCGTCCCA
TTGATATACAGGCCACTACAATGGATGGAGTTAACCTCAGCACCGAGGTTGTCTACAAA
AAAGGCCAGGATTATAGGTTTGCTTGCTACGACCGGGGAGAGCCTGCCGGAGCTACCG
TGTACGGTTTCTGTGGGAAGCCTGTGAGGCCCAAACCTCACAGTCACCATTGACACCA
ATGTGAACAGCACCATTCTGAACCTTGGAGGATAATGTACAGTCATGGAAACCTGGAGAT
ACCCTGGTCAATTGCCAGTACTGATTACTCCATGTACCAGGCAGAAGAGTTCCAGGTGCT
TCCCTGCAGATCCTGCGCCCCCAACCAGGTCAAAGTGGCAGGGAAACCAATGTACCTGC
ACATCGGGGAGGAGATAGACGGCGTGGACATGCGGGCGGAGGTTGGGCTTCTGAGCCGG
AACATCATAGTGATGGGGGAGATGGAGGACAAATGCTACCCCTACAGAAACCACATCTG
CAATTTCTTTGACTTCGATACCTTTGGGGGCCACATCAAGTTTGCTCTGGGATTTAAGG
CAGCACACTTGGAGGGGCACGGAGCTGAAGCATATGGGACAGCAGCTGGTGGGTCAGTAC
CCGATTCACCTTCCACCTGGCCGGTGTATGTAGACGAAAGGGGAGGTTATGACCCACCCAC
ATACATCAGGGACCTCTCCATCCATCATACTTCTCTCGCTGCGTCACAGTCCATGGCT
CCAATGGCTTGTGATCAAGGACGTTGTGGGCTATAACTCTTTGGGCCACTGCTTCTTC
ACGGAAGATGGGCCGGAGGAACGCAACACTTTTGACCACTGTCTTGGCCTCCTTGTC
GTCTGGAACCTCCTCCCCTCGGACCGTGACAGCAAGATGTGCAAGATGATCACAGAGG
ACTCCTACCCAGGGTACATCCCCAAGCCCAGGCAAGACTGCAATGCTGTGTCCACCTTC
TGGATGGCCAATCCCAACAACCTCATCAACTGTGCCGCTGCAGGATCTGAGGAAAC
TGGATTTTGGTTTATTTTTTACCACGTACCAACGGGGCCCTCCGTGGGAATGTACTCCC
CAGGTTATTCAGAGCACATTCCACTGGGAAAATTCTATAACAACCGAGCACATTCCAAC
TACCGGGCTGGCATGATCATAGACAACGGAGTCAAAACCACCGAGGCCTCTGCCAAGGA
CAAGCGGCCGTTCTCTCAATCATCTCTGCCAGATACAGCCCTCACCAGGACGCCGACC
CGCTGAAGCCCCGGGAGCCGGCCATCATCAGACACTTCATTGCCCTACAAGAACCAGGAC
CACGGGGCCTGGCTGCGCGGCGGGGATGTGTGGCTGGACAGCTGCCGGTTTGTCTGACAA
TGGCATTGGCCTGACCCTGGCCAGTGGTGGAACCTTCCCGTATGACGACGGCTCCAAGC
AAGAGATAAAGAACAGCTTGTTTGTGGCGAGAGTGGCAACGTGGGGACGGAAATGATG
GACAATAGGATCTGGGGCCCTGGCGGCTTGGACCATAGCGGAAGGACCTCCCTATAGG

CCAGAATTTTCCAATTAGAGGAATTGAGTTATATGATGGCCCCATCAACATCCAAAAC
GCACTTTCCGAAAGTTTGTGGCCCTGGAGGGCCGGCACACCAGCGCCCTGGCCTTCCGC
CTGAATAATGCCTGGCAGAGCTGCCCCATAACAACGTGACCGGCATTGCCTTTGAGGA
CGTTCCGATTACTTCCAGAGTGTTCTTCGGAGAGCCTGGGCCCTGGTTCAACCAGCTGG
ACATGGATGGGGATAAGACATCTGTGTTCCATGACGTGACGGCTCCGTGTCCGAGTAC
CCTGGCTCCTACCTCACGAAGAATGACAACTGGCTGGTCCGGCACCCAGACTGCATCAA
TGTTCCCGACTGGAGAGGGGCCATTTGCAGTGGGTGCTATGCACAGATGTACATTCAAG
CCTACAAGACCAGTAACCTGCGAATGAAGATCATCAAGAATGACTTCCCCAGCCACCCT
CTTTACCTGGAGGGGGCGCTCACCAGGAGCACCCATTACCAGCAATACCAACCGGTTGT
CACCTTGCAGAAGGGCTACACCATCCACTGGGACCAGACGGCCCCCGCCGAACCTCGCCA
TCTGGCTCATCAACTTCAACAAGGGCGACTGGATCCGAGTGGGGCTCTGCTACCCGCGA
GGCACCACATTCTCCATCCTCTCGGATGTTCACAATCGCCTGCTGAAGCAAACGTCCAA
GACGGGCGTCTTCGTGAGGACCTTGCAGATGGACAAAGTGGAGCAGAGCTACCCTGGCA
GGAGCCACTACTACTGGGACGAGGACTCAGGGCTGTTGTTTCTGAAGCTGAAAGCTCAG
AACGAGAGAGAGAAGTTTGCTTTCTGCTCCATGAAAGGCTGTGAGAGGATAAAGATTAA
AGCTCTGATTCCAAAGAACGCAGGCGTCAGTGAAGTGCACAGCCACAGCTTACCCCAAGT
TCACCGAGAGGGCTGTCTGAGACGTGCCGATGCCCAAGAAGCTCTTTGGTTCTCAGCTG
AAAACAAAGGACCATTCTTGGAGGTGAAGATGGAGAGTTCCAAGCAGCACTTCTTCCA
CCTCTGGAACGACTTCGCTTACATTGAAGTGGATGGGAAGAAGTACCCCAAGTTTCGGAGG
ATGGCATCCAGGTGGTGGTGATTGACGGGAACCAAGGGCGCGTGGTGAGCCACACGAGC
TTCAGGAACTCCATTCTGCAAGGCATACCATGGCAGCTTTTCAACTATGTGGCGACCAT
CCCTGACAATTCCATAGTGCTTATGGCATCAAAGGGAAGATACGTCTCCAGAGGCCCAT
GGACCAGAGTGCTGGAAAAGCTTGGGGCAGACAGGGGTCTCAAGTTGAAAGAGCAAATG
GCATTGTTGGCTTCAAAGGCAGCTTCCGGCCCATCTGGGTGACACTGGACACTGAGGA
TCACAAAGCCAAAATCTTCCAAGTTGTGCCCATCCCTGTGGTGAAGAAGAAGAAGTTGT
GAGGACAGCTGCCGCCCGGTGCCACCTCGTGGTAGACTATG

Figure 4. Nucleic acid sequence of ColoUp2 (SEQ ID NO: 5)

GCCCCCTGGCCCGAGCCGCGCCCGGGTCTGTGAGTAGAGCCGCCCCGGGCACCGAGCGCT
GGTCGCGCGCTCTCCTTCCGTTATATCAACATGCCCCCTTTCTCTGTTGCTGGAAGCCGTC
TGTGTTTTCTGTTTTCCAGAGTGCCCCATCTCTCCCTCTCCAGGAAGTCCATGTAAG
CAAAGAAACCATCGGGAAGATTTTCAGCTGCCAGCAAAATGATGTGGTGCTCGGCTGCAG
TGGACATCATGTTTTCTGTTAGATGGGTCTAACAGCGTCGGGAAAGGGAGCTTTGAAAGG
TCCAAGCACTTTGCCATCACAGTCTGTGACGGTCTGGACATCAGCCCCGAGAGGGTCTCAG
AGTGGGAGCATTCCAGTTCAGTTCCTCATCTGGAATCCCCCTTGGATTCATTTT
CAACCCAACAGGAAGTGAAGGCAAGAATCAAGAGGATGGTTTTCAAAGGAGGGCGCACG
GAGACGGAACCTTGCTCTGAAATACCTTCTGCACAGAGGGTTGCCTGGAGGCAGAAATGC
TTCTGTGCCCCAGATCCTCATCATCGTCACTGATGGGAAGTCCCAGGGGGATGTGGCAC
TGCCATCCAAGCAGCTGAAGGAAAGGGGTGTCACTGTGTTTGCTGTGGGGGTGAGGTTT
CCCAGGTGGGAGGAGCTGCATGCACTGGCCAGCGAGCCTAGAGGGCAGCACGTGCTGTT
GGCTGAGCAGGTGGAGGATGCCACCAACGGCCTCTTCAGCACCTCAGCAGCTCGGCCA
TCTGCTCCAGCGCCACGCCAGACTGCAGGGTCGAGGCTCACCCCTGTGAGCACAGGACG
CTGGAGATGGTCCGGGAGTTCGCTGGCAATGCCCCATGCTGGAGAGGATCGCGGCGGAC
CCTTGCGGTGCTGGCTGCACACTGTCCCTTCTACAGCTGGAAGAGAGTGTTCCCTAACCC
ACCCTGCCACCTGCTACAGGACCACCTGCCAGGCCCTGTGACTCGCAGCCCTGCCAG
AATGGAGGCACATGTGTTCCAGAAGGACTGGACGGCTACCAGTGCTCTGCCCGCTGGC
CTTTGAGGGGAGGCTAACTGTGCCCTGAAGCTGAGCCTGGAATGCAGGGTCGACCTCC
TCTTCCTGCTGGACAGCTCTGCGGGCACCCTCTGGACGGCTTCCTGCGGGCCAAAGTC
TTCGTGAAGCGGTTTGTGCGGGCCGTGCTGAGCGAGGACTCTCGGGCCCGAGTGGGTGT
GGCCACATACAGCAGGGAGCTGCTGGTGGCGGTGCCTGTGGGGGAGTACCAGGATGTGC
CTGACCTGGTCTGGAGCCTCGATGGCATTCCCTTCCGTGGTGGCCCCACCCTGACGGGC
AGTGCCTTGCGGCAGGCGGCAGAGCGTGGCTTCGGGAGCGCCACCAGGACAGGCCAGGA
CCGGCCACGTAGAGTGGTGGTTTTGCTCACTGAGTCACACTCCGAGGATGAGGTTGCGG
GCCAGCGCGTCACGCAAGGGCGCGAGAGCTGCTCCTGCTGGGTGTAGGCAGTGAGGCC
GTGCGGGCAGAGCTGGAGGAGATCACAGGCAGCCAAAGCATGTGATGGTCTACTCGGA
TCCTCAGGATCTGTTCAACCAAATCCCTGAGCTGCAGGGGAAGCTGTGCAGCCGGCAGC
GGCCAGGGTGCCGGACACAAGCCCTGGACCTCGTCTTCATGTTGGACACCTCTGCCTCA
GTAGGGCCCGAGAATTTTGCTCAGATGCAGAGCTTTGTGAGAAGCTGTGCCCTCCAGTT
TGAGGTGAACCCTGACGTGACACAGGTGCGCCTGGTGGTGTATGGCAGCCAGGTGCAGA
CTGCCCTTCGGGCTGGACACCAAACCCACCCGGGCTGCGATGCTGCGGGCCATTAGCCAG
GCCCCCTACCTAGGTGGGGTGGGCTCAGCCGGCACCGCCCTGCTGCACATCTATGACAA
AGTGATGACCGTCCAGAGGGGTGCCCGGCCTGGTGTCCCCAAAGCTGTGGTGGTGTCTCA
CAGGCGGGAGAGGCGCAGAGGATGCAGCCGTTCCTGCCAGAAGCTGAGGAACAATGGC
ATCTCTGTCTTGGTCGTGGGCGTGGGGCCTGTCTAAGTGAGGGTCTGCGGAGGCTTGC
AGGTCCCCGGGATTCCCTGATCCACGTGGCAGCTTACGCCGACCTGCGGTACCACCAGG
ACGTGCTCATTGAGTGGCTGTGTGGAGAAGCCAAGCAGCCAGTCAACCTCTGCAAACCC
AGCCCGTGTCATGAATGAGGGCAGCTGCGTCTGTCAGAATGGGAGCTACCGCTGCAAGTG
TCGGGATGGCTGGGAGGGCCCCCACTGCGAGAACCGATTCTTGAGACGCCCCTGAGGCA
CATGGCTCCCGTGCAGGAGGGCAGCAGCCGTACCCCTCCCAGCAACTACAGAGAAGGCC
TGGGCACTGAAATGGTGCCTACCTTCTGGAATGTCTGTGCCCCAGGTCTTAGAATGTC
TGCTTCCCGCCGTGGCCAGGACCACTATTCTCACTGAGGGAGGAGGATGTCCCAACTGC
AGCCATGCTGCTTAGAGACAAGAAAGCAGCTGATGTCAACCACAAACGATGTTGTTGAA
AAGTTTTGATGTGTAAGTAAATACCCACTTTCTGTACCTGCTGTGCCTTGTTGAGGCTA

TGTCATCTGCCACCTTTCCCTTGAGGATAACAAGGGTCCTGAAGACTTAAATTTAGC
GGCCTGACGTTTCCTTTGCACACAATCAATGCTCGCCAGAATGTTGTTGACACAGTAATG
CCCAGCAGAGGCCTTTACTAGAGCATCCTTTGGACGG

Figure 5. Nucleic acid sequence of Osteopontin (SEQ ID NO: 6)

GCAGAGCACAGCATCGTCGGGACCAGACTCGTCTCAGGCCAGTTGCAGCCTTCTCAGCC
AAACGCCGACCAAGGAAAACTCACTACCATGAGAATTGCAGTGATTGCTTTTGCTCC
TAGGCATCACCTGTGCCATACCAGTTAAACAGGCTGATTCTGGAAGTTCTGAGGAAAAG
CAGCTTTTACAACAAATACCCAGATGCTGTGGCCACATGGCTAAACCCTGACCCATCTCA
GAAGCAGAATCTCCTAGCCCCACAGACCTTCCAAGTAAGTCCAACGAAAGCCATGACC
ACATGGATGATATGGATGATGAAGATGATGATGACCATGTGGACAGCCAGGACTCCATT
GACTCGAACGACTCTGATGATGTAGATGACACTGATGATTCTCACCAGTCTGATGAGTC
TCACCATTCTGATGAATCTGATGAACTGGTCACTGATTTTCCCACGGACCTGCCAGCAA
CCGAAGTTTTCACTCCAGTTGTCCCCACAGTAGACACATATGATGGCCGAGGTGATAGT
GTGGTTTATGGACTGAGGTCAAAATCTAAGAAGTTTTCGCAGACCTGACATCCAGTACCC
TGATGCTACAGACGAGGACATCACCTCACACATGGAAAGCGAGGAGTTGAATGGTGCAT
ACAAGGCCATCCCCGTTGCCAGGACCTGAACGCGCCTTCTGATTGGGACAGCCGTGGG
AAGGACAGTTATGAAACGAGTCAGCTGGATGACCAGAGTGCTGAAACCCACAGCCACAA
GCAGTCCAGATTATATAAGCGGAAAGCCAATGATGAGAGCAATGAGCATTCCGATGTGA
TTGATAGTCAGGAACTTTCCAAAGTCAGCCGTGAATTCCACAGCCATGAATTTACAGC
CATGAAGATATGCTGGTTGTAGACCCCAAAGTAAGGAAGAAGATAAACACCTGAAATT
TCGTATTTCTCATGAATTAGATAGTGCATCTTCTGAGGTCAATTAAAAGGAGAAAAAAT
ACAATTTCTCACTTTGCATTTAGTCAAAAGAAAAAATGCTTTATAGCAAAATGAAAGAG
AACATGAAATGCTTCTTTCTCAGTTTATTGGTTGAATGTGTATCTATTTGAGTCTGGAA
ATAACTAATGTGTTTGATAATTAGTTTAGTTTGTGGCTTCATGGAACTCCCTGTAAAC
TAAAAGCTTCAGGGTTATGTCTATGTTCAATTCTATAGAAGAAATGCAAACCTATCACTGT
ATTTTAATATTTGTTATTCTCTCATGAATAGAAATTTATGTAGAAGCAAACAAAATACT
TTTACCCACTTAAAAGAGAATATAACATTTTATGTCACTATAATCTTTTGTTTTTTAA
GTTAGTGTATATTTTGTGTGATTATCTTTTGTGGTGTGAATAAATCTTTTATCTTGA
ATGTAATAAGAATTTGGTGGTGTCAATTGCTTATTTGTTTTCCCACGGTTGTCCAGCAA
TTAATAAACATAACCTTTTTTACTGCCTAAAAA

Figure 6. Nucleic acid sequence of ColoUp3 (SEQ ID NO: 7)

AAAGGGGCAAGAGCTGAGCGGAACACCGGCCCCGCGTTCGCGGCAGCTGCTTCACCCCTC
TCTCTGCAGCCATGGGGCTCCCTCGTGGACCTCTCGCGTCTCTCCTCCTTCTCCAGGTT
TGCTGGCTGCAGTGC GCGGCCTCCGAGCCGTGCCGGGCGGTCTTCAGGGAGGCTGAAGT
GACCTTGGAGGCGGGAGGCGCGGAGCAGGAGCCCGGCCAGGCGCTGGGGAAAGTATTCA
TGGGCTGCCCTGGGCAAGAGCCAGCTCTGTTTAGCACTGATAATGATGACTTCACTGTG
CGGAATGGCGAGACAGTCCAGGAAAGAAGGTCACTGAAGGAAAGGAATCCATTGAAGAT
CTTCCCATCCAAACGTATCTTACGAAGACACAAGAGAGATTGGGTGGTTGCTCCAATAT
CTGTCCCTGAAAATGGCAAGGGTCCCTTCCCCCAGAGACTGAATCAGCTCAAGTCTAAT
AAAGATAGAGACACCAAGATTTTCTACAGCATCACGGGGCCGGGGGCAGACAGCCCCC
TGAGGGTGTCTTCGCTGTAGAGAAGGAGACAGGCTGGTTGTTGTTGAATAAGCCACTGG
ACCGGGAGGAGATTGCCAAGTATGAGCTCTTTGGCCACGCTGTGTGTCAGAGAATGGTGCC
TCAGTGGAGGACCCCATGAACATCTCCATCATCGTGACCGACCAGAATGACCACAAGCC
CAAGTTTACCCAGGACACCTTCCGAGGGAGTGTCTTAGAGGGAGTCCTACCAGGTACTT
CTGTGATGCAGGTGACAGCCACGGATGAGGATGATGCCATCTACACCTACAATGGGGTG
GTTGCTTACTCCATCCATAGCCAAGAACCAAAGGACCCACACGACCTCATGTTCACCAT
TCACCGGAGCACAGGCACCATCAGCGTCATCTCCAGTGGCCTGGACCGGGAAAAAGTCC
CTGAGTACACACTGACCATCCAGGCCACAGACATGGATGGGGACGGCTCCACCACCACG
GCAGTGGCAGTAGTGGAGATCCTTGATGCCAATGACAATGCTCCCATGTTTGACCCCCA
GAAGTACGAGGCCCATGTGCCTGAGAATGCAGTGGGCCATGAGGTGCAGAGGCTGACGG
TCACTGATCTGGACGCCCCCACTCACCAGCGTGGCGTGCCACCTACCTTATCATGGGC
GGTGACGACGGGGACCATTTTACCATCACCACCCACCCTGAGAGCAACCAGGGCATCCT
GACAACCAGGAAGGGTTTGGATTTTGGAGGCCAAAAACCAGCACACCCTGTACGTTGAAG
TGACCAACGAGGCCCTTTTGTGCTGAAGCTCCCAACCTCCACAGCCACCATAGTGGTC
CACGTGGAGGATGTGAATGAGGCACCTGTGTTTGTCCCACCCTCCAAAGTCGTTGAGGT
CCAGGAGGGCATCCCCACTGGGGAGCCTGTGTGTGTCTACACTGCAGAAGACCCTGACA
AGGAGAATCAAAGATCAGCTACCGCATCCTGAGAGACCCAGCAGGGTGGCTAGCCATG
GACCCAGACAGTGGGCAGGTACAGCTGTGGGCACCCTCGACCGTGAGGATGAGCAGTT
TGTGAGGAACAACATCTATGAAGTCATGGTCTTGCCATGGACAATGGAAGCCCTCCCA
CCACTGGCACGGGAACCCTTCTGCTAACACTGATTGATGTCAATGACCATGGCCAGTC
CCTGAGCCCCGTGAGATCACCATCTGCAACCAAAGCCCTGTGCGCCAGGTGCTGAACAT
CACGGACAAGGACCTGTCTCCCCACACCTCCCCTTTCCAGGCCAGCTCACAGATGACT
CAGACATCTACTGGACGGCAGAGGTCAACGAGGAAGGTGACACAGTGGTCTTGTCCCTG
AAGAAGTTCCTGAAGCAGGATACATATGACGTGCACCTTTCTCTGTCTGACCATGGCAA
CAAAGAGCAGCTGACGGTGATCAGGGCCACTGTGTGCGACTGCCATGGCCATGTGCGAAA
CCTGCCCTGGACCCCTGGAAGGGAGGTTTCATCCTCCCTGTGCTGGGGGCTGTCTGGCT
CTGCTGTTCTCTGCTGGTGCTGCTTTTGTGGTGAGAAAGAAGCGGAAGATCAAGGA
GCCCCTCCTACTCCAGAAAGATGACACCCGTGACAACGTCTTCTACTATGGCGAAGAGG
GGGTGGCGAAGAGGACCAGGACTATGACATCACCCAGCTCCACCGAGGTCTGGAGGCC
AGGCCGGAGGTGGTTCTCCGCAATGACGTGGCACCAACCATCATCCCGACACCCATGTA
CCGTCTCGGCCAGCCAACCCAGATGAAATCGGCAACTTTATAATTGAGAACCTGAAGG
CGGCTAACACAGACCCACAGCCCCGCCCTACGACACCTCTTGGTGTTCGACTATGAG
GGCAGCGGCTCCGACGCGCGTCCCTGAGCTCCCTCACCTCCTCCGCCTCCGACCAAGA
CCAAGATTACGATTATCTGAACGAGTGGGGCAGCCGCTTCAAGAAGCTGGCAGACATGT
ACGGTGGCGGGGAGGACGACTAGGCGGCCTGCCTGCAGGGCTGGGGACCAACGTCAGG
CCACAGAGCATCTCAAGGGGTCTCAGTTCCCCCTTCAGCTGAGGACTTCGGAGCTTGT

CAGGAAGTGGCCGTAGCAACTTGGCGGAGACAGGCTATGAGTCTGACGTTAGAGTGGTT
GCTTCCTTAGCCTTTCAGGATGGAGGAATGTGGGCAGTTTGACTTCAGCACTGAAAACC
TCTCCACCTGGGCCAGGGTTGCCTCAGAGGCCAAGTTTCCAGAAGCCTCTTACCTGCCG
TAAAATGCTCAACCCCTGTGTCCTGGGCCTGGGCCTGCTGTGACTGACCTACAGTGGACT
TTCTCTCTGGAATGGAACCTTCTTAGGCCTCCTGGTGCAACTTAATTTTTTTTTTTAAT
GCTATCTTCAAAACGTTAGAGAAAGTTCTTCAAAAGTGCAGCCCAGAGCTGCTGGGCCC
ACTGGCCGTCCTGCATTTCTGGTTTCCAGACCCCAATGCCTCCCATTTCGGATGGATCTC
TGCGTTTTTATACTGAGTGTGCCTAGGTTGCCCCTTATTTTTTATTTTCCCTGTTGCGT
TGCTATAGATGAAGGGTGAGGACAATCGTGTATATGTACTAGAACTTTTTTATTAAAGA
AACTTTTCCCAGAAAAAAA

Figure 7. Nucleic acid sequence of ColoUp4 (SEQ ID NO: 8)

ATGAAGCACCTGAAGCGGTGGTGGTCGGCCGGCGGCGGCCTCCTGCACCTCACCCCTCCT
GCTGAGCTTGGCGGGGCTCCGCGTAGACCTAGATCTTTACCTGCTGCTGCCGCCGCCCA
CCCTGCTGCAGGACGAGCTGCTGTTCTTGGGCGGCCCGGCCAGCTCCGCCTACGCGCTC
AGCCCCCTTCTCGGCCTCGGGAGGGTGGGGGCGCGCGGGCCACTTGCACCCCAAGGGCCG
GGAGCTGGACCCTGCCGCGCCGCCGAGGGCCAGCTGCTCCGGGAGGTGCGCGCGCTCG
GGGTCCCCTTCGTCCCTCGCACCAGCGTGGATGCATGGCTGGTGCACAGCGTGGCTGCC
GGGAGCGCGGACGAGGCCACGGGCTGCTCGGCGCCGCCGCCGCTCGTCCACCGGAGG
AGCCGGCGCCAGCGTGGACGGCGGCAGCCAGGCTGTGCAGGGGGGCGGCGGGGACCCCC
GAGCGGCTCGGAGTGGCCCCCTTGACGCCGGGAAGAGGAGAAGGCACCCGCGGAACCG
ACGGCTCAGGTGCCGGACGCTGGCGGATGTGCGAGCGAGGAGAATGGGGTACTAAGAGA
AAAGCACGAAGCTGTGGATCATAGTTCCCAGCATGAGGAAAATGAAGAAAGGGTGTGAG
CCCAGAAGGAGAACTCACTTCAAGCAGAAATGATGATGATGAAAACAAATAGCAGAGAAA
CCTGACTGGGAGGCAGAAAAGACCACTGAATCTAGAAATGAGAGACATCTGAATGGGAC
AGATACTTCTTTCTCTCTGGAAGACTTATTCAGTTTGCTTTCATCACAGCCTGAAAATT
CACTGGAGGGCATCTCATTGGGAGATATTCTCTTCCAGGCAGTATCAGTGATGGCATG
AATTCTTCAGCACATTATCATGTAACTTCAGCCAGGCTATAAGTCAGGATGTGAATCT
TCATGAGGCCATCTTGCTTTGTCCCAACAATACATTTAGAAGAGATCCAACAGCAAGGA
CTTCACAGTCACAAGAACCATTCTGCAGTTAAATTCTCATACCACCAATCCTGAGCAA
ACCCTTCTGGAACATAATTGACAGGATTTCTTTCACCGGTTGACAATCATATGAGGAA
TCTAACAAGCCAAGACCTACTGTATGACCTTGACATAAATATATTTGATGAGATAAACT
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GCTGCGCAGAACTGTGCTAAACGCAAATTGGACATAATTTTGAATTTAGAAGATGATGT
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CTATTAACATAATGAAACAGAACTGCATGACCTTTATCATGATATTTTGTAGTAGATTA
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TTAAGTACTGCTACTTGAATAACTCAGTTAACGCTGTTTTGAAGCTTACATGGACAAAT
GTTTAGGACTTCAAGATCACACTTGTGGGCAATCTGGGGGAGCCACAACCTTTTCATGAA
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TAAGACTTTCATCTTGGCAGCCATCCTTTTTAAGAGTAAGTTGGTTACTTCAAAAAGA
GCAACACTGGGGATCAAATTATTTAAGAGGTATTTCAAGTTTAAATGCAAAATAGCC
TTATTTTCATTTAGTTTGTAGCACTATAGTGAGCTTTTCAAACACTATTTTAATCTTT
ATATTTAACTTATAAATTTTGCTTTCTATGGAAATAAATTTTGTATTTGTATTAATAA
AAAAAA

Figure 8. Nucleic acid sequence of ColoUp5 (SEQ ID NO: 9)

ATGAAGTTGGAGGTGTTTCGTCCCTCGCGCGGCCACGGGGACAAGCAGGGCAGTGACCT
GGAGGGCGCGGGCGGCAGCGACGCGCCGTCCCCGCTGTCGGCGGCGGGAGACGACTCCC
TGGGCTCAGATGGGGACTGCGCGGCCAAGCCGTCCGCGGGCGGCGGCCAGAGATACG
CAGGGCGACGGCGAACAGAGTGCGGGAGGCGGGCCGGGGGCGGAGGAGGCGATCCCGGC
AGCAGCTGCTGCAGCGGTGGTGGCGGAGGGCGCGGAGGCCGGGGCGGCGGGGCCAGGCG
CGGGCGGCGCGGGGAGCGGCGAGGGTGACGCGAGCAAGCCATATACGCGGCGGCCCAAG
CCCCCTACTCGTACATCGCGCTCATCGCCATGGCCATCCGCGACTCGGCGGGCGGGCG
CTTGACGCTGGCGGAGATCAACGAGTACCTCATGGGCAAGTTCCCTTTTTTCCGCGGCA
GCTACACGGGCTGGCGCAACTCCGTGCGCCACAACCTTTTCGCTCAACGACTGCTTCGTC
AAGGTGCTGCGCGACCCCTCGCGGCCCTGGGGCAAGGACAACTACTGGATGCTCAACCC
CAACAGCGAGTACACCTTCGCCGACGGGGTCTTCCGCCGCCGCCGCAAGCGCCTCAGCC
ACCGCGCGCCGGTCCCCGCGCCCGGGCTGCGGCCCCGAGGAGGCCCGGGCCTCCCCGCC
GCCCCGCCGCCCGCGCCCGCCGCCCGGCCCTCGCCCCGCATGCGCTCGCCCGCCGCCA
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TGGGGCGCCGCGCCCTGCCCGCCGCTGCCCGCGTTCCCCGCGCTCCTCCCCGCGGCGCC
CTGCAGGGCCCTGCTGCCGCTCTGCGCGTACGGCGCGGGCGAGCCGGCGCGGCTGGGCG
CGCGCGAGGCCGAGGTGCCACCGACCGCGCCGCCCTCCTGCTTGACCTCTCCCGGCG
GCGGCCCCCGCCAAGCCACTCCGAGGCCCGGCGGCCGGCGGCGCGCACCTGTACTGCCC
CCTGCGGCTGCCCCGAGCCCTGCAGGCGGCCTTAGTCCGNCGTCCTGGCCCCGACCTGT
CGTACCCGGTGGAGACGCTCCTAGCTTGA

Figure 9. Nucleic acid sequence of ColoUp6 (SEQ ID NO: 10)

GGCAGATGAAATATAAGATTCATCAACCACATTTGACAGCCCATGGCAGGTTTCCTGTT
TTCCATCGTCCCTCTGCAGGTCACAGACACACAGAGCCAGCCGTGGCAGGCTCAGCCG
GGGTCCGGGGCTGCTAACACGGCTACATTCCTCCCCCAGGGCCAAGGGAAATCCTGAG
CGCAGGCCAGGGTTGTTTGGTTTTGAGGTGTGCTGGGATGAAAGGCACCCTGGAAGTGG
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AGTCCTTTGAAAGTACTTTCCTTCAAACAGTGACTGCCACAAAGGCATCAGATATTCAC
CACCTTCTCGGCTGCCTCAGCACAGCAAGCTTTATTCTGGGACCTGAGATCCTGTTCTG
AGCTGGCTTTCCCTTCTCCAGGCTCGCTCACCTCCCTTTAGAGATAGTGGATGGTAAG
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CAACCTCAAGAAATGGAGAAGCATCATGTGCCAAGTGACTTCAATGTCAATGTGAAGGT
GGATACAGGTCCCAGGAAGATCTGATTAAGGTCCTGGAGGATATGAGACAAGAATATG
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CGAACTGAAGCGCACATTCCAGGCCCTGGAGATTGACCTGCAGGCACAGTACAGCACGA
AATCTGCTTTGGAAAACATGTTATCCGAGACCCAGTCTCGGTACTCCTGCAAGCTCCAG
GACATGCAAGAGATCATCTCCCACTATGAGGAGGAACTGACGCAGCTACGCCACGAACT
GGAGCGGCAGAACAAATGAATACCAAGTGCTGCTGGGCATCAAAACCCACCTGGAGAAGG
AAATCACCACGTACCGACGGCTCCTGGAGGGAGAGAGTGAAGGGACACGGGAAGAATCA
AAGTCGAGCATGAAAGTGTCTGCAACTCCAAAGATCAAGGCCATAACCCAGGAGACCAT
CAACGGAAGATTAGTTCTTTGTCAAGTGAATGAAATCCAAAAGCACGCATGAGACCAAT
GAAAGTTTCCGCCTGTTGTAAAATCTATTTTCCCCCAAGGAAAGTCCTTGCACAGACAC
CAGTGAGTGAGTTCATAAAGATACCCTTGGAATTATCAGACTCAGAACTTTTATTTTT
TTTTTCTGTAAACAGTCTCACCAGACTTCTCATAATGCTCTTAATATATTGCACTTTTCT
AATCAAAGTGCGAGTTTATGAGGGTAAAGCTCTACTTTCCTACTGCAGCCTTCAGATTC
TCATCATTTTGCATCTATTTTGTAGCCAATAAACTCCGCCTAGCAAAAAAAAAA

Figure 10. Nucleic acid sequence of ColoUp7 (SEQ ID NO: 11)

TTTTTTTTTTAAAAAAGAGGCTTGGTAAGTTTTTGATGCTTAGTTGACTTTTAGCATT
ATCCAGCATTGTATTATGAACCAGTGAGTACTGTAATTTTCTTCCCTTTCAGAAAG
ACTCAAAGGGAACATATAAATGTTTCCTATTTTAAATGTGGCAATAGTGTAGCTAACAC
TGGTACAGACGGAATAAACACACCTCTAATATTCTCCTGAAGATTGGTGATCCAGTTT
CAAATAAGGTATGGGAAAAACAGATGTTTTCATTATCGCCACTTAATCCTTACTTCCGA
TTATAATTATACATGTTTGGCTGTAATAACTATACTAAAGCATGCTTGTGAAAGTAGAC
TTCTACAAGGACAGAAAACCCACAACAACAAAGATCGATCACGAAAGACAAGGCATA

Figure 11. Nucleic acid sequence of ColoUp8 (SEQ ID NO: 12)

CTTTTCTTCCGCACGGTTGGAGGAGGTCGGCTGGTTATCGGGAGTTGGAGGGCTGAGGT
CGGGAGGGTGGTGTGTACAGAGCTCTAGGACTCACGCACCAGGCCAGTCGCGGATTTTG
GGCCGAGGCCTGGGTTACAAGCAGCAAGTGCGCGGTTGGGGCCACTGCGAGGCCGTTTTT
AGAAAAC TGT TTTAAAACAAAGAGCAATTGATGGATAAATCAGGAATAGATTCTCTTGAC
CATGTGACATCTGATGCTGTGGAAC TTGCAAATCGAAGTGATAACTCTTCTGATAGCAG
CTTATTTAAAAC TCA GTGTATCCCTTACTCACCTAAAGGGGAGAAAAGAAACCCCATTC
GAAAATTTGTTTCGTACACCTGAAAGTGTTTACGCAAGTGATT CATCAAGTGACTCATCT
TTTGAACCAATACCATTGACTATAAAAGCTATTTTTTGAAGATTCAAGAACAGGAAAAA
GAGATATAAAAAAAGAAAAAGAGGAGGTACCAGCCAACAGGAAGACCACGGGGAAGAC
CAGAAGGAAGGAGAAATCCTATATACTCACTAATAGATAAGAAGAAACAATTTAGAAGC
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AATGAAGATTTTGACAGTCGTAGATACAAATTTTTTGGATGATGATGGATCCATTTCTCC
TATTGAGGAGTCAACAGCAGAGGATGAGGATGCAACACATCTTGAAGATAACGAATGTG
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TCACAACATGGAATTCCTCGAATAACAATTTATTGACTTTAAATAATTTTGTCTAATGC
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GCTCGAAGTTTCTCTAGTGTTTTCTGTGGAAGGAATAAAAATTTGAGTTTCAAAAAAAA
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Figure 12. Amino acid sequence of full-length ColoUp1 protein (SEQ ID NO: 13)

MGAAGRQDFLFKAMLTISWLTLTCTFPGATSTVAAGCPDQSPPELQPWNPGHDQDHHVHIG
QGKTLTLLTSSATVYSIHISEGGKLVIKDHDEPIVLRTRHILIDNGGELHAGSALCPFQG
NFTIILYGRADEGIQPDPIYGLKYIGVGKGGALELHGQKKLSWTFLNKTLPHPGMAEGG
YFFERSWGHARGVIVHVIDPKSGTVIHSDRFDITYRSKKESERLVQYLNAPDGRILSVAV
NDEGSRNLDDMARKAMTKLGSKHFLHLGFRHPWSFLTVKGNPSSSVEDHIEYHGHRGSA
AARVFKLFQTEHGEYFNVSLSSSEWVQDVEWTEWFDHDKVSQTKGGEKISDLWKAHPGKI
CNRPIDIQATTMDGVNLSTEVVYKKGQDYRFACYDRGRACRSYRVRFLLCGKPVPRPKLTV
TIDTNVNSTILNLEDNVQSWKPGDTLVIASTDYSMYQAEEFQVLPSCRSCAPNQVKVAGK
PMYLHIGEEIDGVDMAEVLGSLSRNIIVMGEMEDKCPYRNHICNFFDFDTFGGHIKFA
LGFKAAHLEGTELKHMGGQLVGQYPIHFHLAGDVDERGGYDPPTYIRDLSIHHTFSRCV
TVHGSNGLLIKDVVGYNLSLGHCFPTEDGPEERNTFDHCLGLLVKSGTLLPSDRDSKMCK
MITEDSYPGYIPKPRQDCNAVSTFWMANPNNNLINCAAAGSEETGFWFIFHHVPTGPSV
GMYSPTYSEHIPLGKFYNNRAHSNYRAGMIIDNGVKTTEASAKDKRPFLSIISARYSPH
QDADPLKPREPAIRHFIAAYKNQDHGAWLRGGDVWLDSCRFAADNGIGLTLASGGTFPYD
DGSKEIKNSLFGESGNVGTEMMDNRIWGPGLDHSGRTPIGQNFPIRGIQLYDGPI
NIQNCTFRKFVALEGRHTSALAFLNNAWQSCPHNNVTGIAFEDVPITSRVFFGEPGPW
FNQLDMDGDKTSVFHDVDGSVSEYPGSYLTKNNDNLVRHPDCINVPDWRGAICSGCYAQ
MYIQAYKTSNLRMKIINKDFPSHPLYLEGALTRSTHYQQYQPVVTLQKGYTIHWDQTAP
AELAIWLINFNKGDWIRVGLCYPRGTTFSILSDVHNRLKQTSKTVGVFVRTLQMDKVEQ
SYPGRSHYYWDEDSGLLFLKLKAQNEREKFAFCSMKGCEKIKALIPKNAGVSDCTAT
AYPKFTERAVVDVPMPKKLFGSQLKTKDHFLEVKMESSKQHFHLWNTFAYIEVDGKKY
PSSSEDGIQVVVIDGNQGRVVSHTSFRNSILQIPWQLFNYVATIPDNSIVLMASKGRYV
SRGPWTRVLEKLGADRGLKLKEQMAFVGFGKSFRPIWVTLDTEDEHKAKIFQVVPPIPVVK
KKKL

Figure 13. Amino acid sequence of full-length ColoUp2 protein (SEQ ID NO: 14)

MPPFLLLEAVCVFLFSRVPPSLPLQEVHVSKEITIGKISAASKMMWCSAAVDIMFLLDGS
NSVGKGSFERSKHFAITVCDGLDISPERVRVGAFQFSSTPHLEFPLDSFSTQQEVKARI
KRMVFKGGRTETELALKYLLHRGLPGGRNASVPQILIIIVTDGKSQGDVALPSKQLKERG
VTVFAVGVRFRPRWHEELHALASEPRGQHVLLEQVEDATNGLFSTLSSSAICSSATPDCR
VEAHPCEHRTLEMVREFAGNAPCWRGSRRTLAVLAAHCPFYSWKRVFLTHPATCYRTTC
PGPCDSQPCQNGGTCVPEGLDGYQCLCPLAFGGEANCALKLSLECRVDLLFLLDSSAGT
TLDGFLRAKVFKRFVRAVLSEDSRARVGVATYSRELLVAVPVGEYQDVPDLVWSLDGI
PFRGGPTLTGSALRQAAERGFGSATRTGQDRPRRVVLLTESHSEDEVAGPARHARARE
LLLLGVGSEAVRAELEETGSPKHVMVYSDPQDLFNQIPELQKLC SRQRP GCRTQALD
LVFMLDTSASVGPENFAQM QS FVRSCALQFEVNP DVTQVGLVVYGSQVQTAFGLDTKPT
RAAMLRAISQAPYLGGVGSAGTALLHIYDKVMTVQRGARPGVPKAVVVL TGGRGAEDAA
VPAQKL RNNGISVLVVGVPVLSEGLRRLAGPRDSL IHVAAYADLRYHQDVLI EWLCGE
AKQPVNLCKPSPCMNEGSCVLQNGSYRCKCRDGEWEGPHCENRFLRRP

Figure 14. Amino acid sequence of full-length Osteopontin protein (SEQ ID NO: 15)

MRIAVICFCLLGITCAIPVKQADSGSSEEKQLYNKYPDAVATWLNPDPSQKQNLLAPQT
LPSKSNESHDMDDMDEDDDDHVDSQDSIDSNDSDDVDDTDDSHQSDESHHSDESDEL
VTDFPTDLPATEVFTPVVPTVDTYDGRGDSVVYGLRSKSKKFRRPDIQYPDATDEDITS
HMESEELNGAYKAIPVAQDLNAPSDWDSRGKDSYETSQLDDQSAETHSHKQSRLYKRKA
NDESNEHSDVIDSQELSKVSREFHSHEFHSHEDMLVVDPKSKEEDKHLKFRISHELDSA
SSEVN

Figure 15. Amino acid sequence of full-length ColoUp3 protein (SEQ ID NO: 16)

MGLPRGPLASLLLLQVCWLQCAASEPCRAVFREA EVTLEAGGAEQEPGQALGKVFMGCP
GQEPALFSTDND DFTVRNGETVQERRSLKERNPLKIFPSKRILRRHKRDWV VAPISVPE
NGKGPFPPQRLNQLKSNKDRDTKIFYSITGPGADSPPEGVFAVEKETGWLLLNKPLDREE
IAKYELFGHAVSENGASVEDPMNISIIVTDQNDHKPKFTQDTRGSGVLEGVLPGTSVMQ
VTATDEDDAIYTYNGVVAYSISHSQEPKDPHDLMFTIHRSTGTISVISSGLDREKVPEYT
LTIQATDMGDGSGSTTTAVAVVEILDANDNAPMFDPPQKYEAHVPENAVGHEVQRLTVTDL
DAPNSPAWRATY LIMGGDDGDHFTITTHPESNQGILTTRKGLDFEAKNQHTLYVEVTNE
APFVLKLPTSTATIVVHVEDVNEAPVFVPPSKVVEVQEGIPTGEPVCVYTAEDPDKENQ
KISYRILRDPAGWLAMPDPSGQVTAVGTL DREDEQFVRNNIYEVMLAMDNGSPPTTGT
GTLLLLTLIDVNDHGPVPEPRQITICNQSPVRQVLNITDKDLSPHTSPFQAQLTDDSDIY
WTAEVNEEGDTVVL SLKKFLKQDTYDVHLSLSDHGNKEQLTVIRATVCDCHGHVETCPG
PWKGGFILPVLGAVLALLFLLLVL LLLVLRKKRKIKEPLLLPEDDTRDNV FYYGEEGGGE
EDQDYDITQLHRGLEARPEVVL RNDVAPTIIPTMYRPRPANPDEIGNFIIENLKAANT
DPTAPPYDTLLVFDYEGSGSDAASLS SLTSSASDQDQDYDYLNEWGSRFKKLADMYGGG
EDD

Figure 16. Amino acid sequence of full-length ColoUp4 protein (SEQ ID NO: 17)

MKHLKRWWSAGGGLLHLTLLLSLAGLRVDLDLYLLLPPPTLLQDELLFLGGPASSAYAL
SPFSASGGWGRAGHLHPKGRELDPAAPPEGQLLREVRALGVFPVPRTSVDAWLVHSVAA
GSADEAHGLLGAAAASSTGGAGASVDGGSQAVQGGGDPRAARSGPLDAGEEEKAPAEF
TAQVPDAGGCASEENGVLREKHEAVDHSSQHEENEERVSAQKENSLOQNDNDDENKIAEK
PDWEAEKTTESRNERHLNGTDTSFSLLEDLFQLLSSQPENSLEGISLGDIPLPGSISDGM
NSSAHYHVNFSQAISQDVNLHEAILLCPNNTFRRDPTARTSQSQEPFLQLNSHTTNPEQ
TLPGTNLTGFLSPVDNHRNLTSQDLLYDLINIFDEINLMSLATEDNFDPIDVSQLEF
EPDSDSGLSLDSSHNNNTSVIKSNSSHVCDEGAIGYCTDHESSSHHDLEGAVGGYYPEP
SKLCHLDQSDSDFHGDLTFOHVFNHTYHLQPTAPESTSEPPFPWPGKSQKIRSRYLEDT
DRNLSRDEQRAKALHIPFSVDEIVGMPVDSFNSMLSRYLTDLQVSLIRDIRRRGKNKV
AAQNCRKRKLDIILNLEDDVCNLQAKKETLKREQAQCNKAINIMKQKLHDLYHDI FSRL
RDDQGRPVNPNHYALQCTHDGSILIVPKELVASGHKKETQKGKRK

Figure 17. Amino acid sequence of full-length ColoUp5 protein (SEQ ID NO: 18)

MKLEVFVPRAAHGDKQGS DLEGAGGS DAPSPLSAAGDDSLGSDGDCAAKPSAGGGARDT
QGDGEQSAGGGPGAEEAIPAAAAA VVAEGAEAGAAGPGAGGAGSGEGARSKPYTRRPK
PPYSYIALIAMAIRDSAGGRLTLAEINEYLMGKFPFFRGSYTGWRNSVRHNLSLNDCFV
KVLRDPSRPWGKDNYWMLNPNSEYTFADGVFRRRRKRLSHRAPVPAPGLRPEEAPGLPA
APPPAPAAPASPRMRSPARQEERAS PAGKFSSSFAIDSILRKPFRRRLRDTAPGTTLQ
WGAAPCPPLPAFFALLPAAPCRALLPLCAYGAGEPARLGAREAEVPPTAPPLLLAPLPA
AAPAKPLRGPAAGGAHLYCPLRLPAALQAALVRRPGPHLSYPVETLLA

Figure 18. Amino acid sequence of full-length ColoUp6 protein (SEQ ID NO: 19)

MEKHHVPSDFNVNVKVDTGPREDLIKVLEDMRQEYELIIKKKHRDLDTWYKEQSAAMSQ
EAASPATVQSRQGDIELKRTFQALEIDLQAQYSTKSALENMLSETQSRYSCKLQDMQE
IISHYEEELTQLRHELERQNNYQVLLGIKTHLEKEITTYRRLLEGESEGTREESKSSM
KVSATPKIKAITQETINGRLVLCQVNEIQKHA

Figure 19. Amino acid sequence of full-length ColoUp8 protein (SEQ ID NO: 20)

MDKSGIDSLDHVTSDAVELANRSDNSSDSSLFKTQCIPIYSPKGEKRNPIRKFVRTPESV
HASDSSSDSSFEPILTIKAIFERFKNRKKRYKKKKKRRYQPTGRPRGRPEGRRNPIYS
LIDKKKQFRSRGSGFPFLESENEKNAPWRKILTFEQAVARGFFNYIEKLKYEHHLKESL
KQMNVGEDLENEFDSSRRYKFLDDGSIPIEESTAEDEDATHLEDNECDIKLAGDSFI
VSSEFPVRLSVYLEEEDITEEAALSKKRATKAKNTGQRGLKM

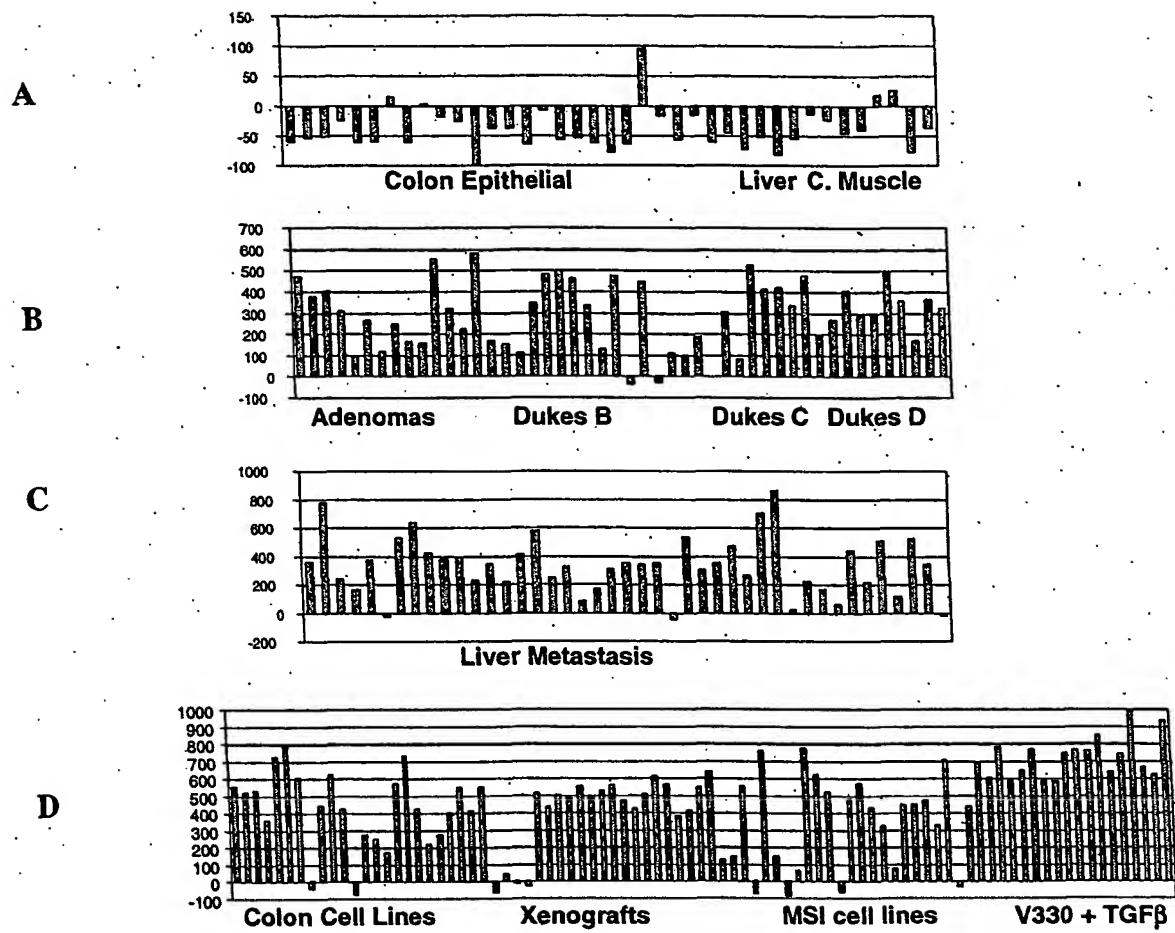
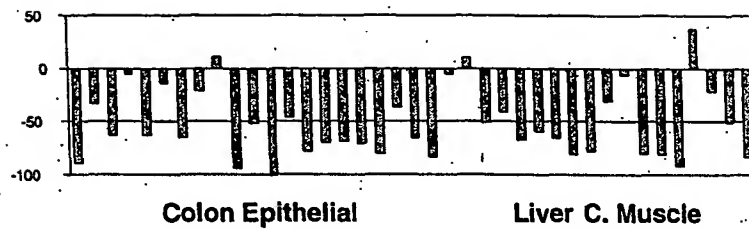
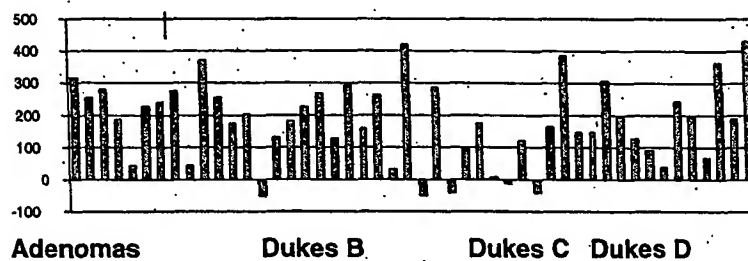


Figure 20

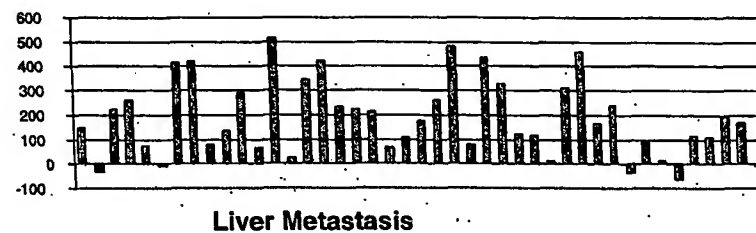
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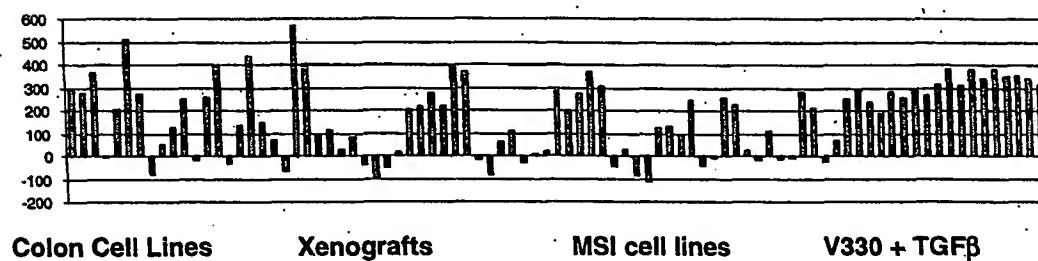
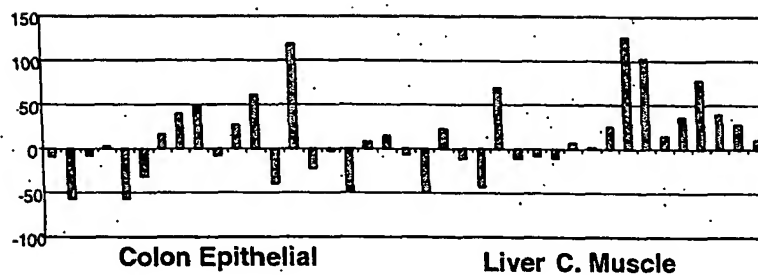
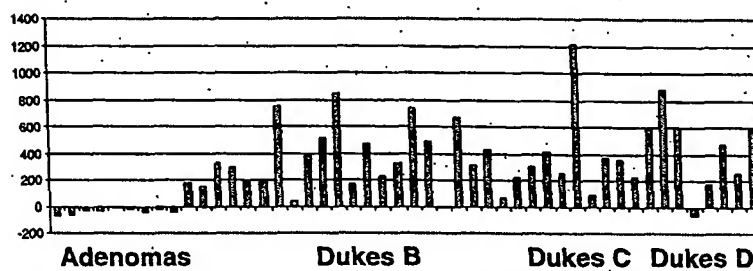


Figure 21

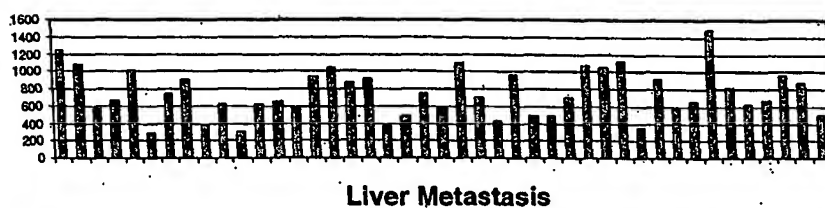
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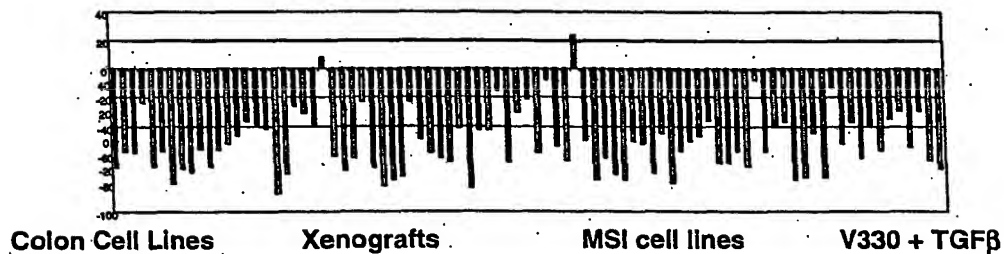
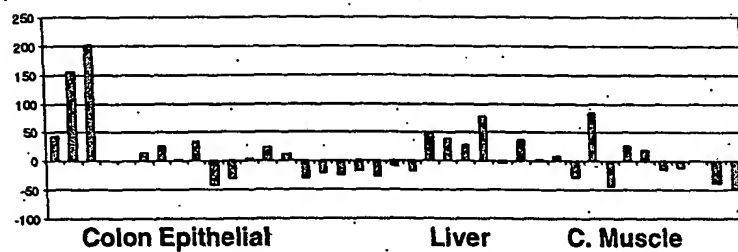
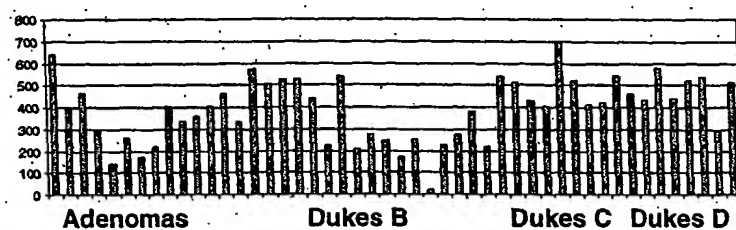


Figure 22

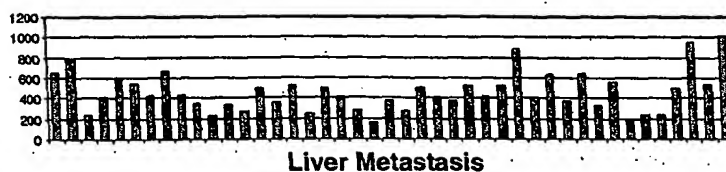
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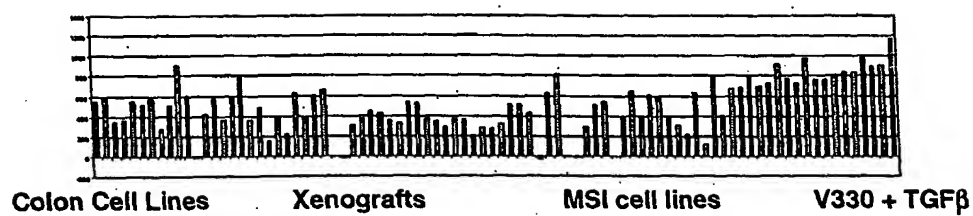
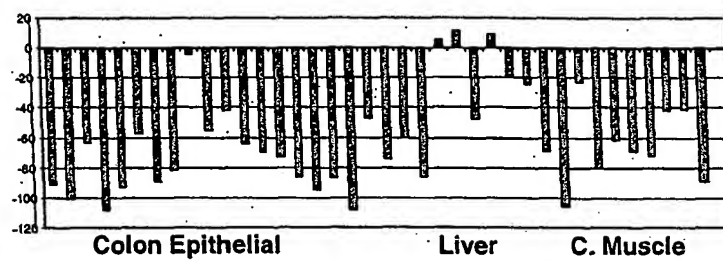
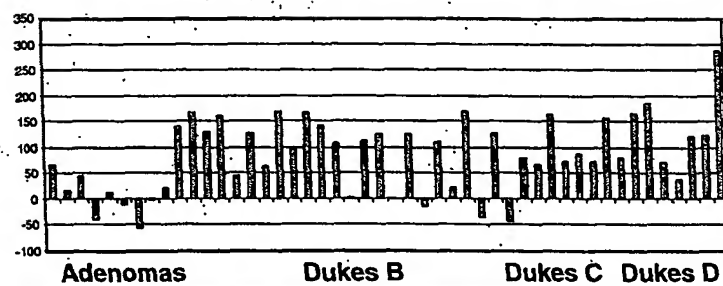


Figure 23

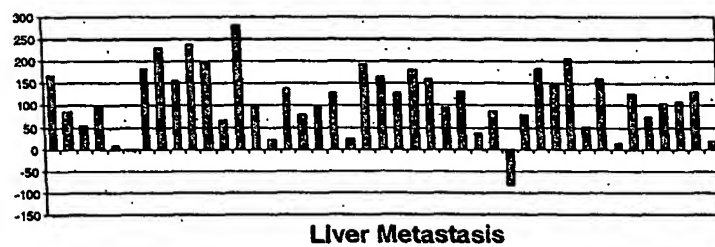
A



B



C



D

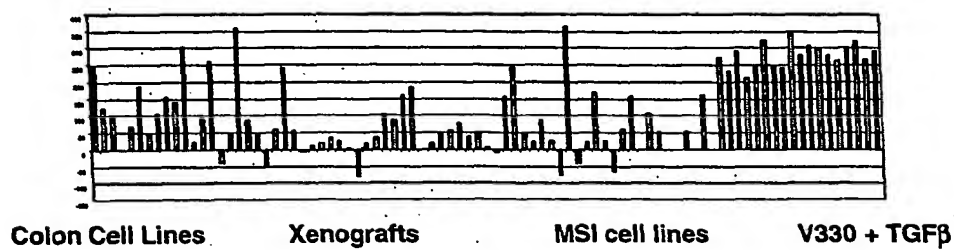
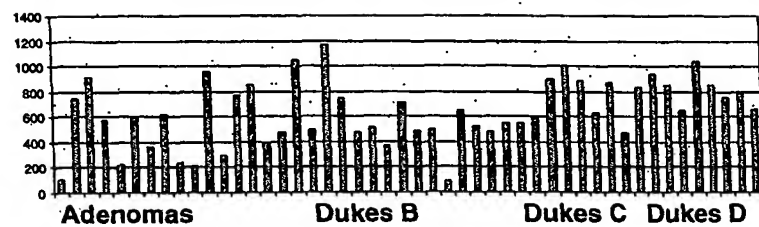


Figure 24

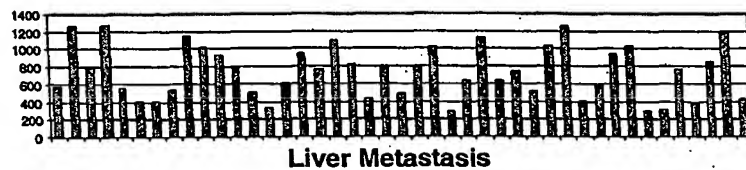
A



B



C



D

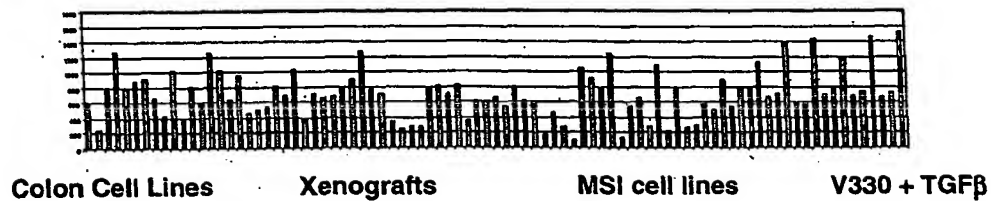
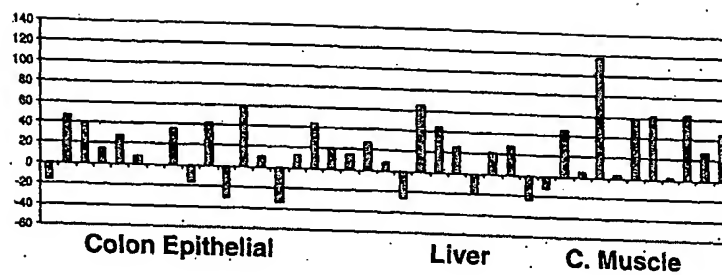
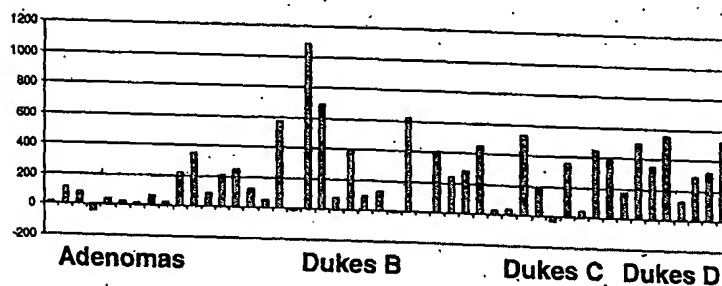


Figure 25

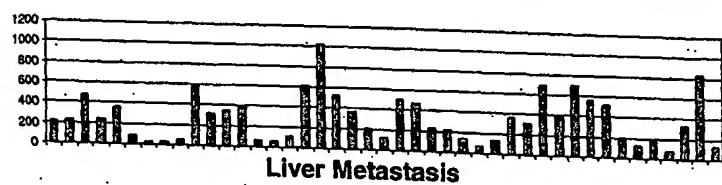
A



B



C



D

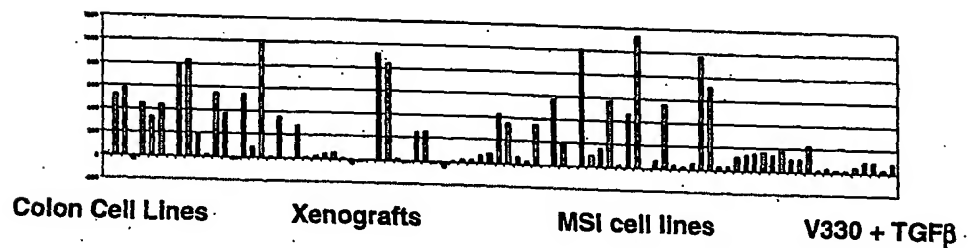
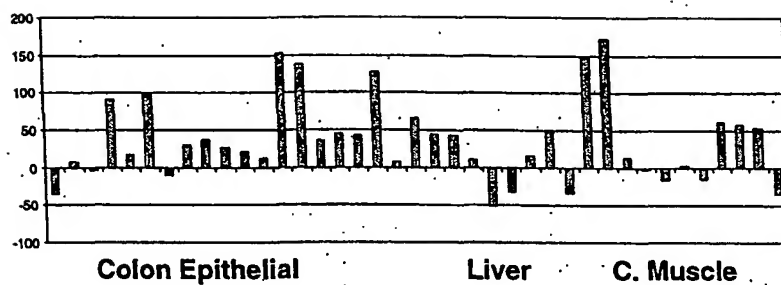
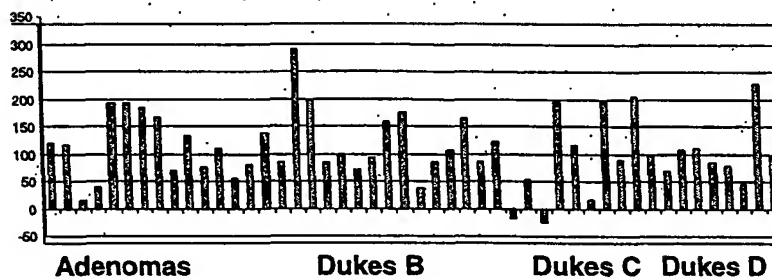


Figure 26

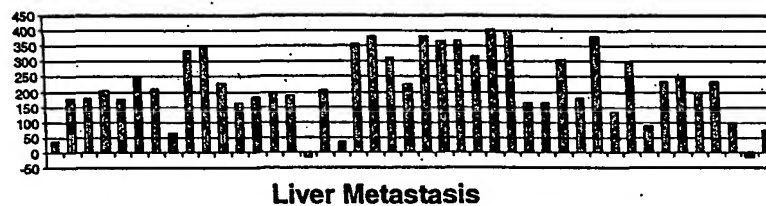
A



B



C



D

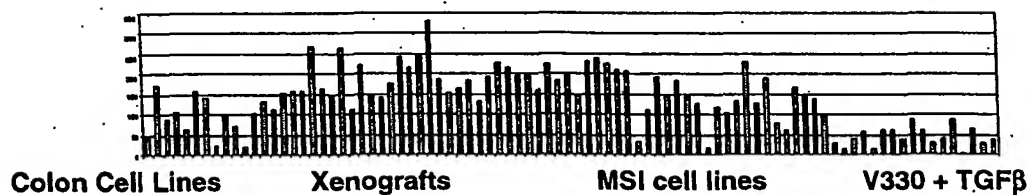
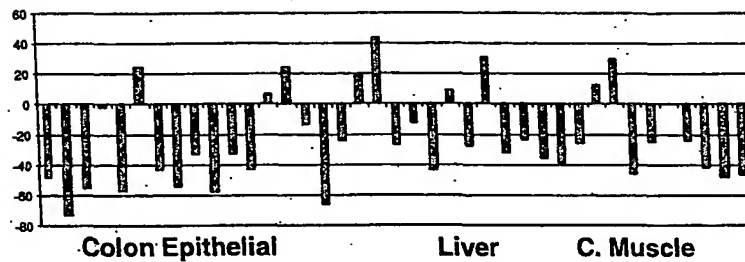
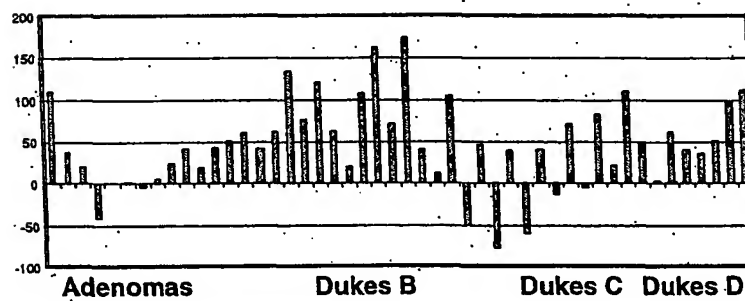


Figure 27

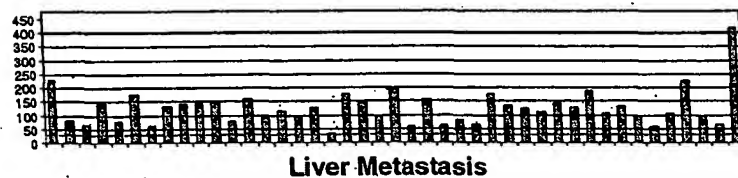
A



B



C



D

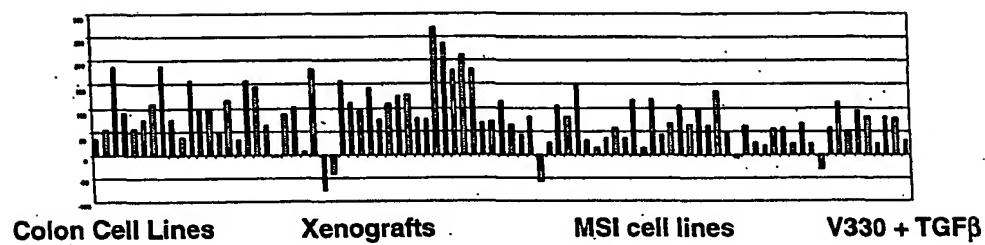


Figure 28

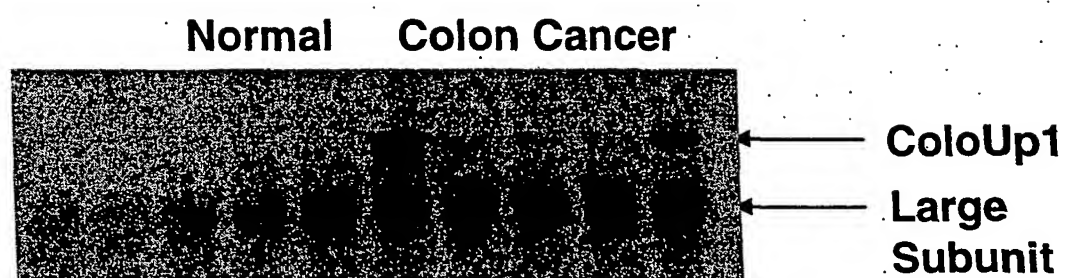


Figure 29A

SAMPLE:

| | | | | | | | |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 7774 | 7824 | 7583 | 8668 | 8677 | 8681 | 4253 | 4297 |
| <u>N</u> | <u>T</u> | <u>N</u> | <u>T</u> | <u>N</u> | <u>T</u> | <u>N</u> | <u>T</u> |

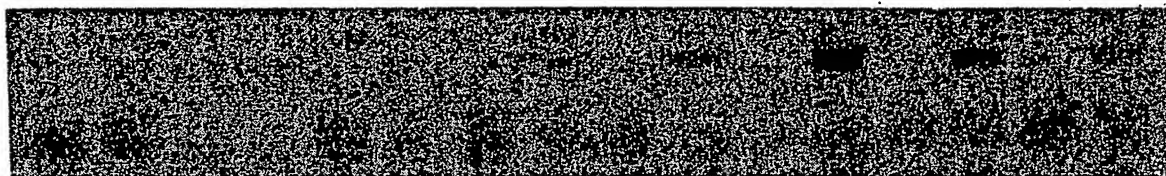


Figure 29B

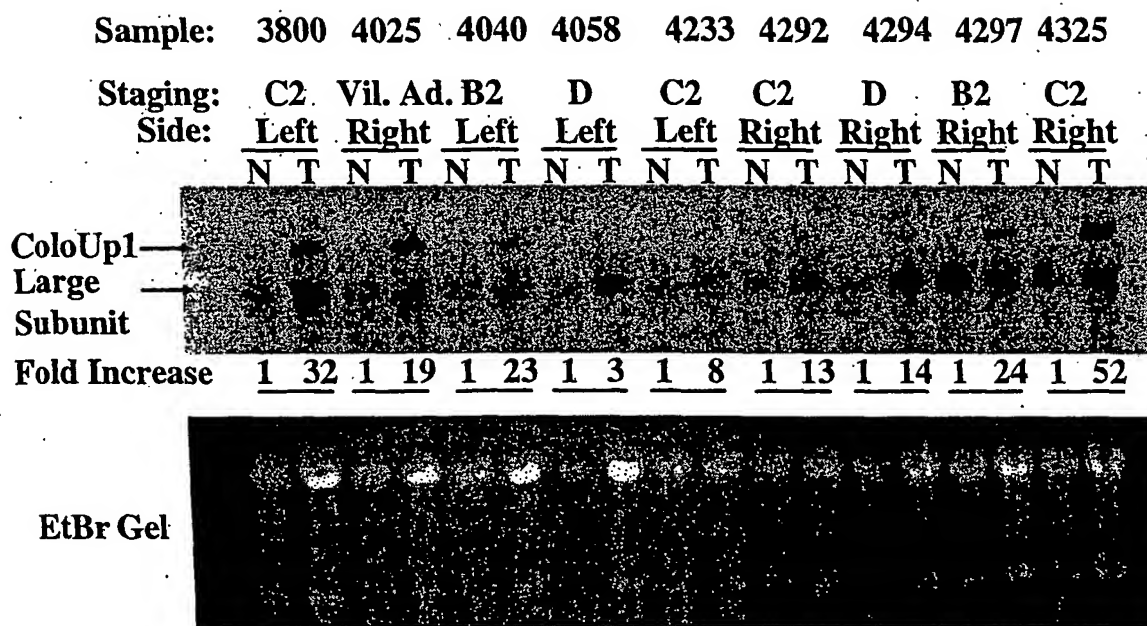


Figure 29C

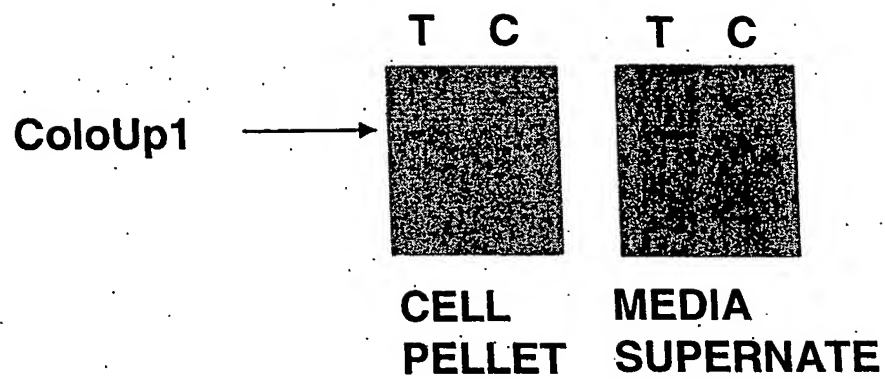


Figure 30A

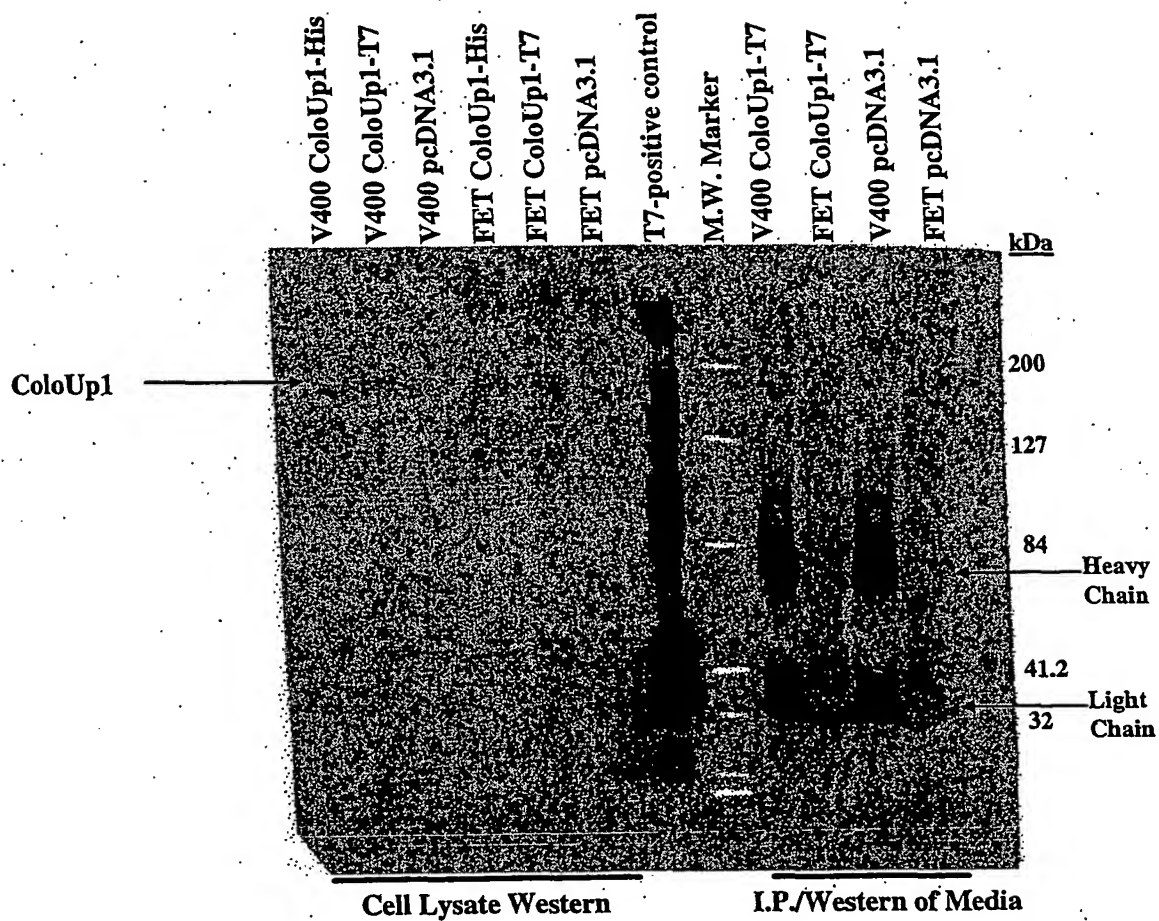


Figure 30B

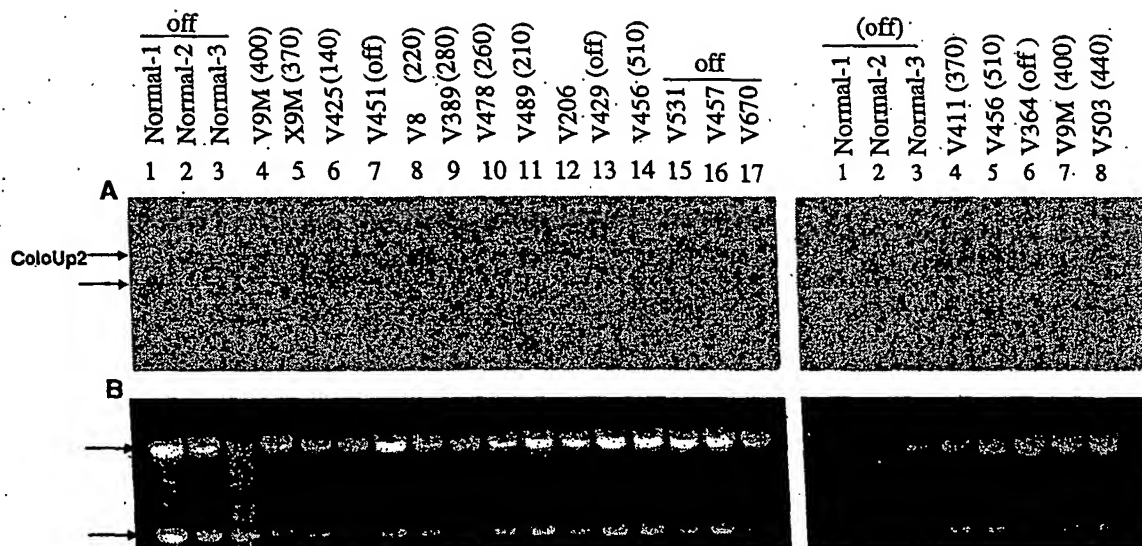


Figure 31

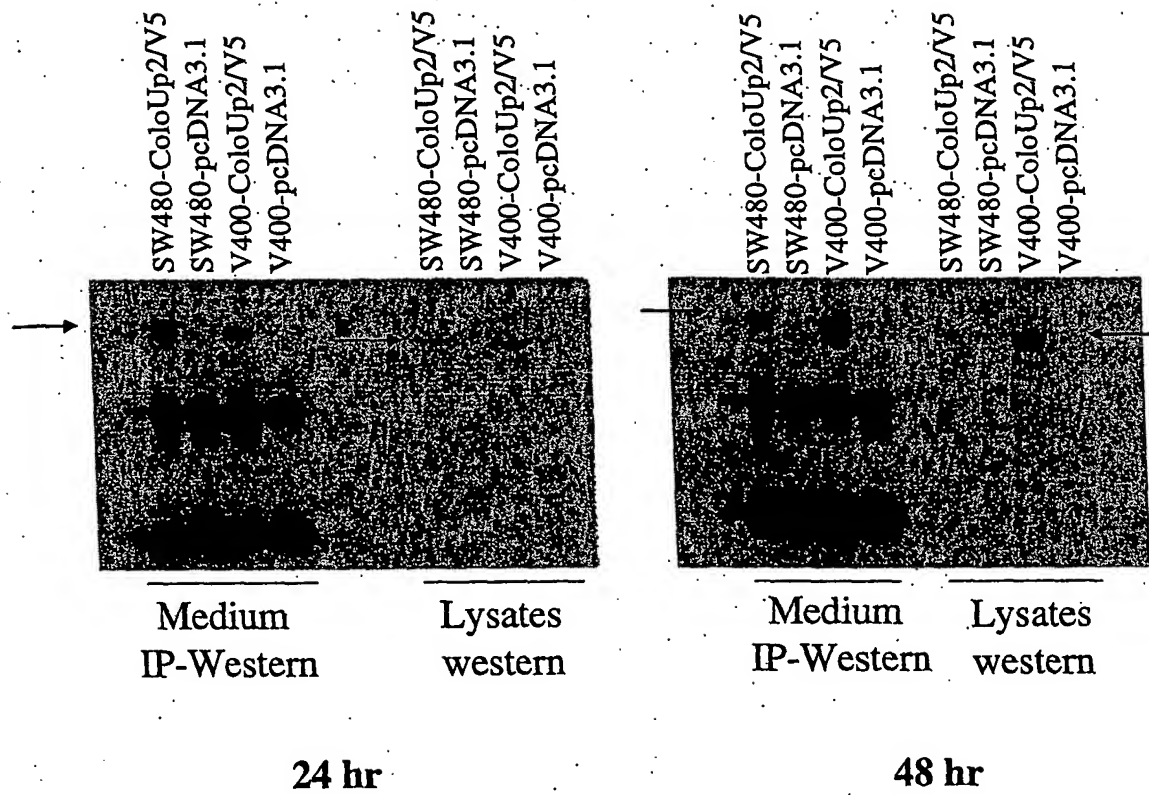


Figure 32

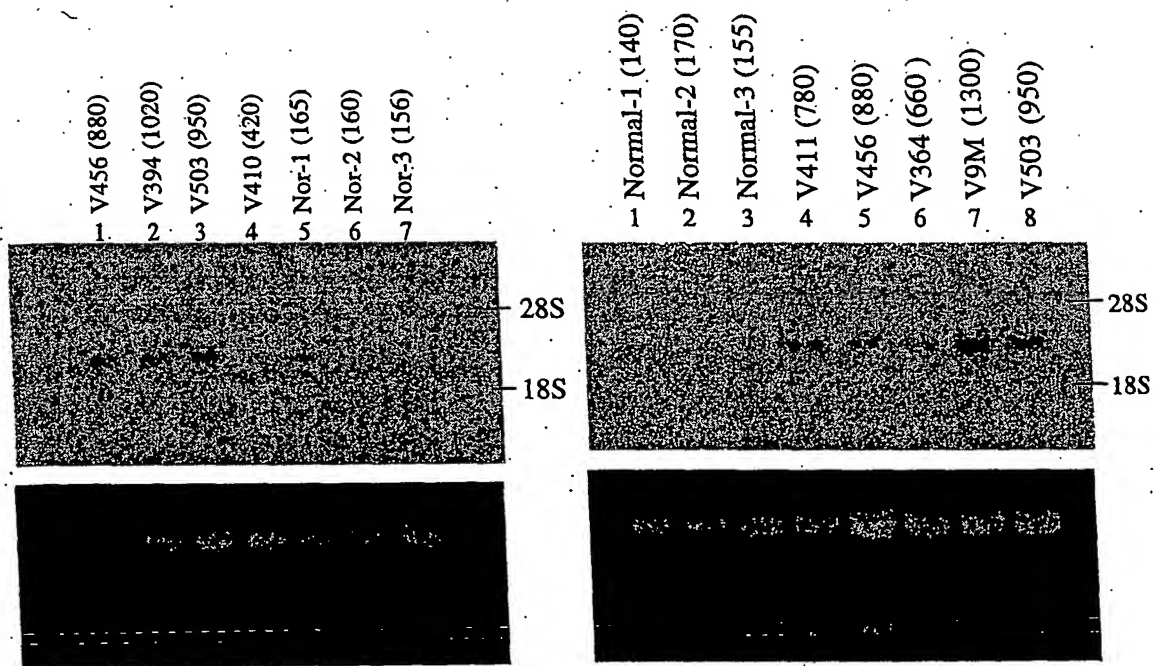


Figure 33

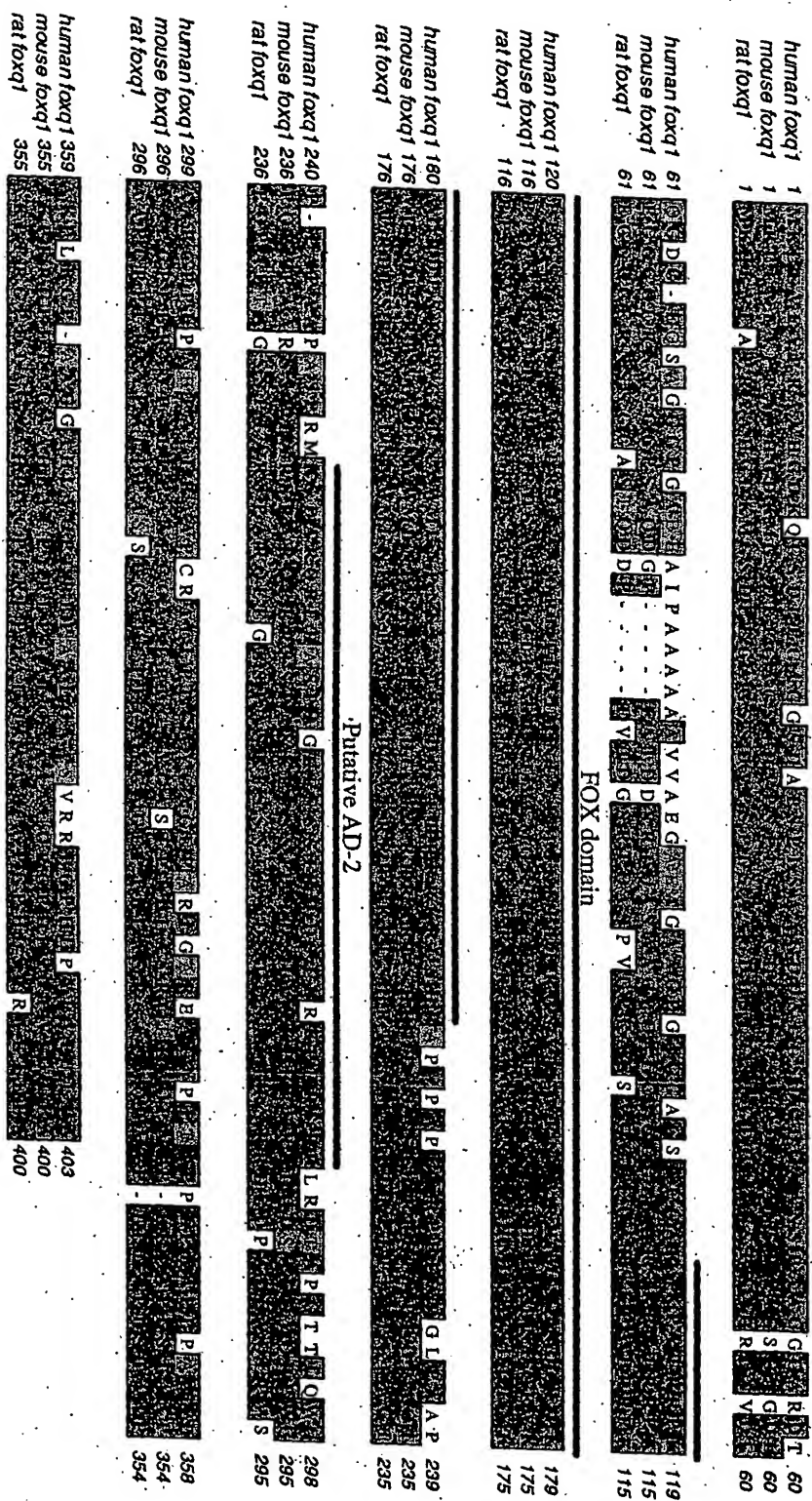


Figure 34

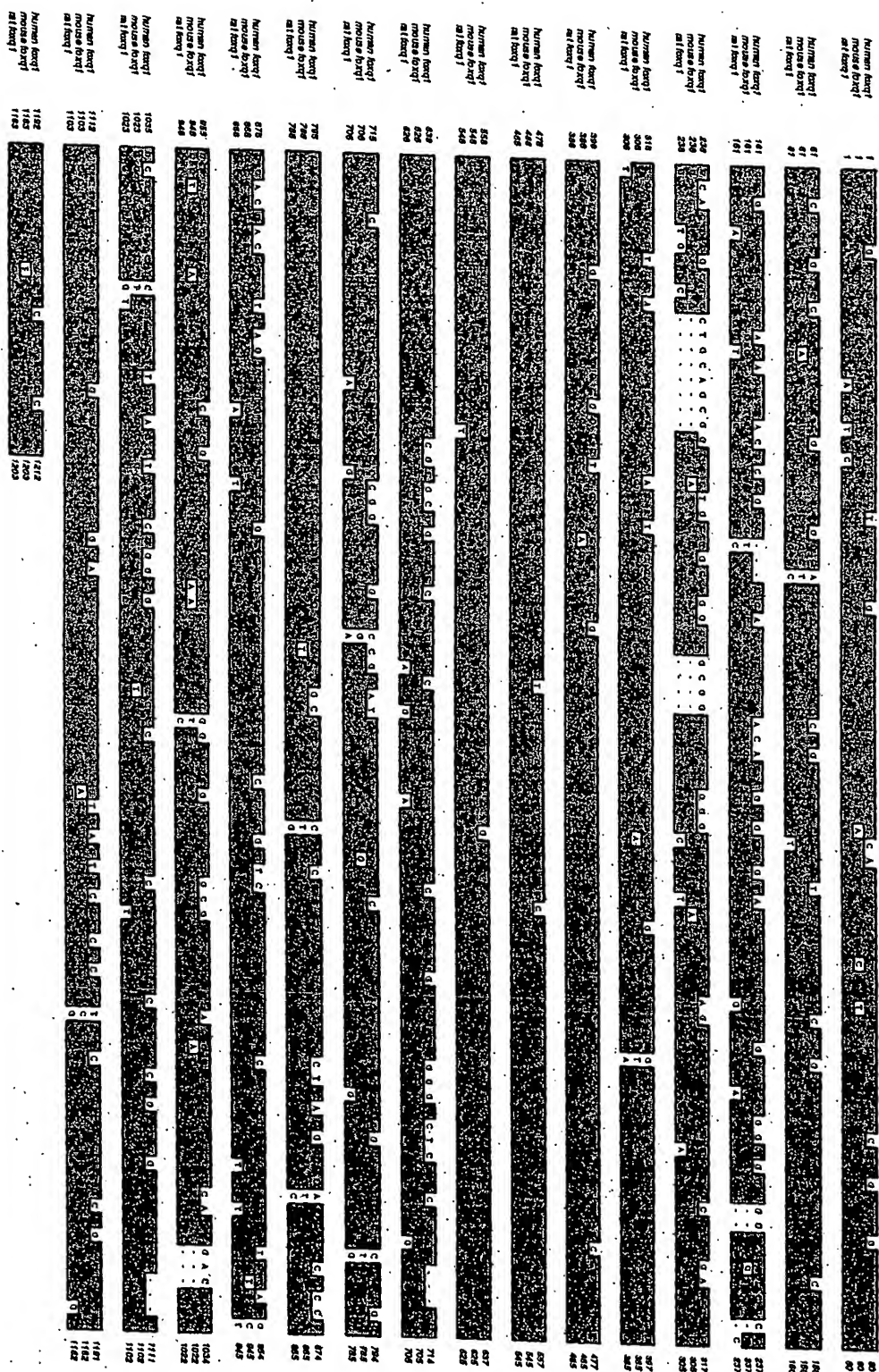


Figure 35

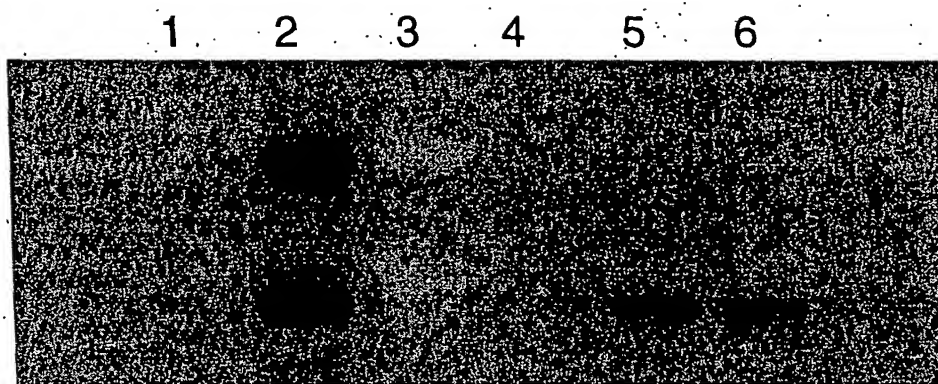


Figure 36

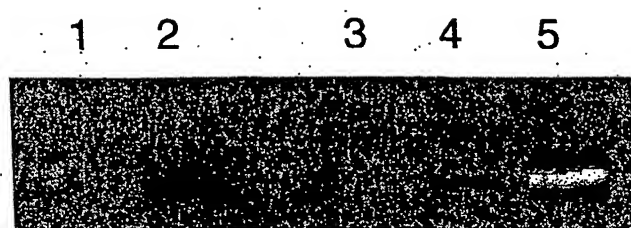


Figure 37

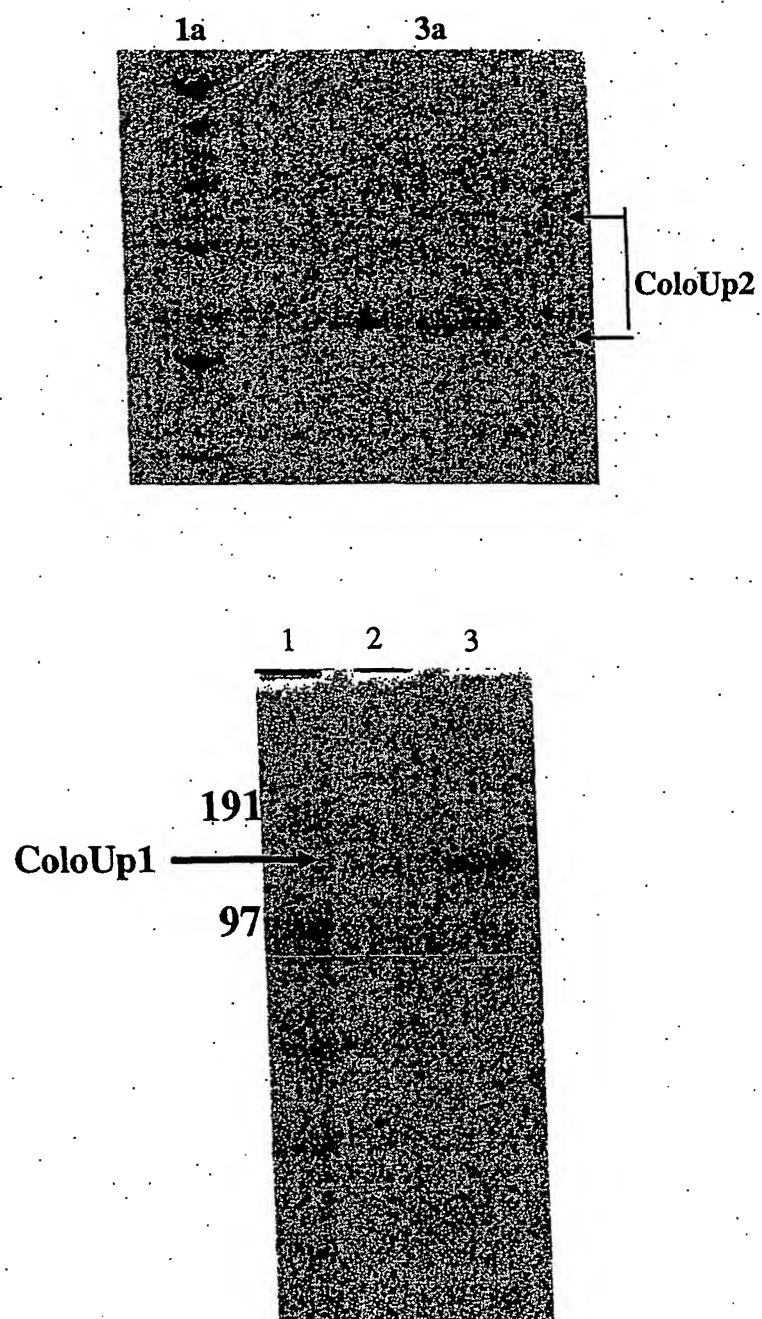
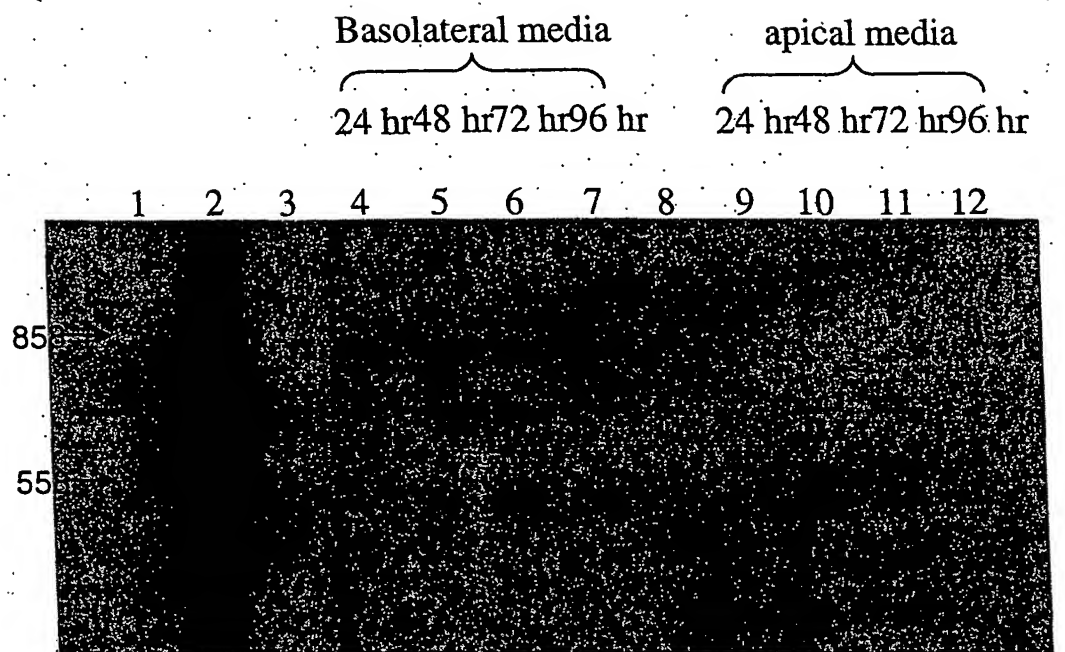
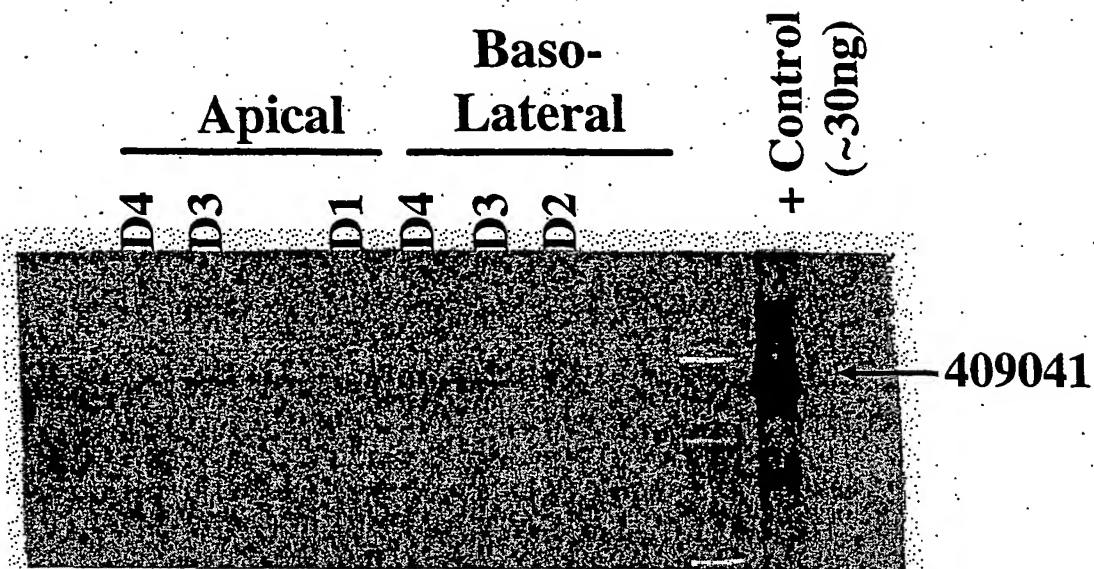


Figure 38



| time points(hr) | resistance | transfection efficiency |
|-----------------|------------|-------------------------|
| 0 | 220 | N/A |
| 24 | 199 | 15% |
| 48 | 184 | 25% |
| 72 | 220 | 30% |
| 96 | 214 | 30% |

Figure 39



| Day | Resistance | % GFP Exp. |
|-----|------------|------------|
| 0 | 300 | 0 |
| 1 | 415 | 10 |
| 2 | 260 | 20 |
| 3 | 206 | 25 |
| 4 | 218 | 25 |

Figure 40

Amino Acid Sequence of a Secreted C-terminal Portion of ColoUp2

AVLAAHCPFYSWKRVFLTHPATCYRTTCPGPCDSQPCQNGGTCVPEGLDGYQCL
CPLAFGGEANCALKLSLECRVDLLFLLDSSAGTTLDGFLRAKVFKRFVRAVLSE
DSRARVGVATYSRELLVAVPVGEYQDVPDLVWSLDGIPFRGGPTLTGSALRQAA
ERGFGSATRTGQDRPRRVVLLTESHSEDEVAGPARHARARELLLLGVGSEAVR
AELEEITGSPKHVMVYSDPQDLFNQIPELQGKLCRQRPGCRTQALDLVFMLDTS
ASVGPENFAQMQSFVRSCALQFEVNPDTVQVGLVVYGSQVQTAFGLDTKPTRA
AMLRAISQAPYLGGVGSAGTALLHIYDKVMTVQRGARPGVPAVVVLTGGRGA
EDAAVPAQKLRNNGISVLVVGVPVLSEGLRRLAGPRDSLHVAAYADLRYHQD
VLIEWLCGEAKQPVNLCKPSPCMNEGSCVLQNGSYRCKCRDGWEGPHCENRFL
RRP (SEQ ID NO:21)

Figure 41